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THE

MISCELLANEOUS TRACTS

OF THE LATE

WILLIAM WITHERING, M.D. F.R.S.

MEMBER OF THE ROYAL ACADEMY OF SCIENCES AT LISBON; FELLOW OF THE
LINNEAN SOCIETY; AUTHOR OF "THE BOTANICAL ARRANGEMENT
OF BRITISH PLANTS," &c. &c. &c.

To which is prefixed

A MEMOIR

OF HIS

Life, Character, and Writings.

IN TWO VOLUMES.

VOL. II.

Nisi utile est quod facimus stulta est gloria.

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No. IX. *Meteorological History of the Year 1791, at Lisbon, by Major Prætorius.*

Year 1791.	State of the sky, with the proportion of time, reckoned in hours.			Rain and dense-wetting fogs.			Winds.	Winds, &c.	Meteors, &c.						Barometer, in French inches and lines.			Thermometer, Fahrenheit's Scale.			Hygrometer, by De Lambert, 24 divisions.		
Months.	Clear & serene sky, or light and high clouds.	Heavy, dark, and lowering clouds.	The sky entirely overcast with clouds.	Quantity of rain, in French inches and lines.	Rained on days.	Heavy fogs. Times and days.	Prevalent winds, their duration, and from what point.	Tempests and high winds, their times, days, directions, and velocity, marked in fathoms per second of time.	Aurora Borealis, day and hour.	Zodiacal lights, times, and days.	Antecrepuscle times and days.	Halos of the Moon, times and days.	Thunder and lightning, times and days.	Earthquakes, times and days.	Highest point and the day.	Lowest point and the day.	Mean of the whole.	Highest point and the day.	Lowest point and the day.	Mean of the whole.	Highest degree of moisture and day.	Lowest degree of moisture and day.	Mean of the whole observation.
January	204	224	316	I. L. 2 3	17	6 times 3, 5, 7, 21, 23, 28	In the beginning westerly, then N and NNE	4 times; on the 18th SSW 5 f. 20th and 21st WNW 6 f. 23d N 5 f.	—	3 times 26, 30, 31	3 times 26, 30, 31	once 14 at 10 in the evening	—	—	28 6 14	27 11 3	28 3⅓	62 6 & 13	39 28	54	23 3	7 25, 27, 29,	16½
Feb.	366	184	122	0 7½	7	9 times 1, 2, 3, 10, 13, 14, 23, 25, 28	NNE to the 10th and alternately NNW	5 times; on the 15th and 16th N 5 and 7 f. 18th, 19th, and 21st NNW 5 and 6 f.	—	3 times 3, 4, 5	3 times 3, 4, 5	—	—	—	28 6½ 13	27 11 20 & 21	28 3½	64 1 & 26	34 8 & 9	50	23 14	6½ 7	10
March	489	180	75	0 2½	4	twice 5, 18	NNE, changing in the evening to NNW	5 times; on the 20th, 22d, 26th, 27th, and 28th, all N, 5 and 6 f.	—	7 times 23 to 29	7 times 23 to 29	—	—	—	28 5½ 15	27 11 31	28 3	82 24	41 14	58½	17 2	6 10, 12, 27,	9½
April	108	202	410	5 9	18	3 times 12, 17, 18	S and SW to the 17th, afterwards NW and NNW	9 times; on the 1st SSW 6 f. 2d S 5 and 6 f. 3d S 7 f. 4th, 5th, 6th S 6 f. 7th, 9th SW 7 and 6 f. 27th WSW 6 f.	—	3 times 28, 29, 30	3 times 28, 29, 30	—	3 times 3, 4, 7	—	28 3½ 29	27 8 3	28 0⅕	80 25	50 28	62½	22 23	7 30	13½
May	294	208	242	2 4	9	3 times 6, 30, 31	NNW and W, variable	Twice; on the 24th and 25th NW 5 and 6 f.	—	—	once 17	twice 11 and 13	once 23	—	28 4½ 15	28 0 23	28 2½	88 18	50 9	63½	22 4 & 31	5 19	11½
June	222	296	202	1 1½	7	3 times 6, 27, 30	W to the 24th, afterwards NW and N	5 times; on the 6th NNW 6 f. 17th and 18th SW, 26th N, 30th NNE, all 5 f	1 bright on the 27th.	—	twice 3 and 8	—	once 1	—	28 3½ 3	27 11 10 & 18	28 1½	92 29	53 3	68½	20 22	5 29	12
July	452	232	60	—	—	twice 2, 31	NNW, with little change	6 times; on the 4th and 5th N 5 and 6 f. 9th, 10th, and 11th N 3, 6, and 5 f. 25th NNW 5 f.	1 bright on the 4th.	—	—	—	—	—	28 3 1 & 22	28 0½ 16 & 19	28 1½	90 3	60 29	72	17 2 & 31	5 10	10½
August	516	134	94	0 1½	1	5 times 6, 7, 20, 21, 22	N, then SW and NW alternately, then N and NE	Once; on the 16th NW 6 f.	—	—	—	—	once 31	—	28 2½ 29	28 0 7 & 8	28 1¾	100 28	61 17 & 18	74	15 1	3 27, 28, 30	8
Sept.	414	184	122	0 8	2	once 5	Variable, NE and NW with calms	3 times; on the 5th, 16th, and 30th NNW 5 f.	—	—	—	once 8	3 times 26, 27, 30	—	28 3 4 & 15	27 10½ 27	28 0⅔	91 2	60 26	74¼	18 9	3 8, 13, 15, 16	7½
October	163	222	354	9 2 flood in the river.	17	twice 17, 18	NE, then NW, then SW and N, at the close again SW	5 times; on the 3d NNW 5 f. 15th SW to NW 6 and 7 f. great, 20th and 31st SSW 5 f.	—	—	—	—	3 times 8, 12, 31	—	28 3½ 25	27 9 15	28 1	82 8	51 16	65	21 18	2½ 2	9¾
Nov.	226	223	271	5 1 flood in the river, 4, 15, 18	16	3 times 15, 21, 25	In the beginning NW, then SSW and S	11 times; on the 2d, 16th, and 17th W 5 f. 4th, 5th, and 19th NW 5 and 7 f. 13th SSW 6 & 8 f. 12th, 15th, & 18th S 8 & 6 f.	1 on the 5th at 6 in the evening.	once 7	—	once 12	5 times 1, 2, 3, 13, 18	1 violent on the 27th at 10 in the evening 45m. and 28th at 2¼ morning	28 6½ 10	27 6 19	28 0⅔	67 22	42 10	54⅓	20 12	5 9 & 10	11½
Dec.	204	276	264	2 2	10	7 times. 1, 2, 4, 10, 12, 23, 26	S, then NW to the 15th, NNE, N and NNW, NE	4 times; on the 3d S 7 and 8 f. great, 5th, 14th, and 23d NW 5 and 6 f.	—	—	once 30	—	—	—	28 8¼ 27	27 7½ 4	28 4	62 10 & 12	40 22	53	21 5 & 10	5 17 & 18	13
Total	3663 Hours.	2565 Hours.	2532 Hours.	29 8 Inches. Lines.	108 Days.	46 Times.	NNW the prevalent wind, next to this NNE and SW.	60 times; the greatest were in April, October, and November.	3 bright.	17 Times.	20 Times.	5 Times.	17 Times.	Two; on the 27th & 28th of November	28 8¼ on the 27th of Dec.	27 6 on the 19th of Nov.	28 2	100 on the 28th of August.	34 on the 8th & 9th of Feb.	62⅓	23 on the 3d Jan. 14th Feb	2½ on the 2d of October.	11

The most remarkable phenomena during the year 1791, were the following :—In February and March the extraordinary serenity of the sky, with the wind constantly at NNE, and want of rain. April, May, and June gave a superfluity of rain. For the three following months a great drought. October and November very rainy and tempestuous. Even December should not have shown a sky so sullen and rainy, seeing the unexampled great and continued height of the barometer. On the 28th of August, Fahrenheit's thermometer was at 100°, and on the 8th and 9th of February at 34°, and on the high ground at the freezing point. The Hygrometer showed the greatest drought on the 2d of October. The total of rain was 29⅔ inches. October gave nearly one-third of it. Of Meteors we have observed three Aurora Boreales. The Earthquake, on the 27th of November, was probably caused by the great rains in October, stopping up the evaporations of the subterraneous exhalations.

OUTLINES

OF

MINERALOGY:

TRANSLATED FROM THE ORIGINAL

OF

Sir Torbern Bergman,

KNIGHT OF THE ORDER OF WASA,

Professor of Chymistry at Upsal, &c.

THE

TRANSLATOR'S

PREFACE.

The pleasure and instruction I received myself from this excellent little work of Professor Bergman, inspired me with a wish to make it more generally known to others. A system like this, founded upon the constituent principles of things, may be improved, but never can be exploded. English names are given, but the Latin ones of the original are still retained, as an acquaintance with them will enable the reader more readily to consult other authors. Blank spaces are left after most of the species, for the convenience of inserting any new ones that may occur. I have added a few new species and some notes; the utility of which will be sufficiently obvious. The table of metals, and the index at the end, will also, I hope, be considered as useful additions.

W. WITHERING.

Birmingham,
1*st September,* 1783.

N.B. The centenary *(centenarius)* of PROFESSOR BERGMAN is equal to 60 Swedish grains, or nearly 57¼ English grains.

The Swedish medicinal pound divided as the English, is to the English as 7416 to 7766,125, that is, as 1 to 1,0472.

The Swedish Kanae, or Cantharus, contains 159,37 English cubic inches, and, therefore, about 5,52 English wine-pints.

THE

AUTHOR'S PREFACE.

In compliance with the request of my learned and amiable friend, the celebrated Mr. Ferber, I transmitted to him a slight sketch of Mineralogy, in which the subjects were arranged according to their constituent or component parts. After perusing it, he requested my permission to publish it. At first I thought it better to suppress a work that was so imperfect, especially when I considered the number of analyses that yet remained to be made. He replied, that a perfect method was not yet to be expected in a subject so extensive, but that having once laid a good foundation, I might occasionally make such additions and corrections, in new editions of the work, as future experiments might render necessary. Indeed, I was fully aware that the system would sooner be rendered perfect, if submitted to the inspection of other more discerning chymists, than if the completion of it rested upon myself only. The different remarks of others will correct errors, which, by a further attention, I might have amended; but if the interest of science be promoted, no matter by whom.

This little work contains GENERA and SPECIES, except in the Appendixes, which, as not properly belonging to my design, contain Genera only.

The GENERA are founded upon the prevalent component parts; the SPECIES upon the diversity of the composition. *Varieties* depend upon external appearances, and therefore are at present omitted.

After this manuscript was sent away, I discovered two species of *stannum sulphuratum* (tin combined with sulphur), one of which contains about forty per cent. of sulphur, the other only twenty. The first has the appearance of *aurum musivum;* the latter partly resembles *antimonium sulphuratum* (crude antimony), but does not contain antimony. Both are contaminated by a small quantity of copper. I got them from Nerchinskoi in Siberia.*

As to the *Terra Ponderosa* (heavy earth), I have long been aware of its great resemblance to calx of lead, and have even lately found a method of precipitating it by the phlogisticated alkali;* so that I verily believe it to be of a metallic nature, although it has never yet been made into a regulus; and, therefore, I still place it with the earths, until its situation be better ascertained.

---

* In this translation they are introduced in their proper places. W.

If Providence allots me life and health, I hope, a few years hence, to republish this imperfect sketch, corrected and enlarged.

---

[*] There is no difficulty in doing this: either the fossil or the vegetable fixed alkali phlogisticated, precipitates the terra ponderosa, instantly and entirely, out of the nitrous, muriatic, or vegetable acids. W.

OF A

NATURAL SYSTEM

OF

MINERALOGY.

---

§ 1.—THE Mineral Kingdom consists of the fossil substances found in the earth. These are either entirely destitute of organic structure, or, having once possessed it, possess it no longer: such are the petrefactions.

§ 2.—It is requisite, for the proper discrimination of fossils, to establish certain characters, whereby they may, at all times and in all places, be distinguished from one another. The science that teaches these is called Mineralogy.

§ 3.—As in the vegetable kingdom different methods have been formed upon the roots, the leaves, the flowers, the fruit, &c. so also in Mineralogy many methods may be devised, and there is no doubt of the utility of contemplating inorganic bodies in every point of view; for the more comparisons are multiplied, the more evidently do resemblances or differences appear.

§ 4.—But as the chief object of the science is to render fossils subservient to the uses of man, it is evident that that method must be the best which displays their component parts: for these being well understood, we know what to expect from them; we accommodate our designs to their nature, and spend not our labour and money in vain attempts inconsistent with their inherent qualities.

§ 5.—There is a power implanted by the Creator in organized bodies, which, upon the acquisition of proper nutriment, unfolds and evolves the structure which before lay concealed in the fecundated egg or seed. Similar vessels, in each species, absorb, convey, and assimilate the nourishment in the same manner; so that the appearance and structure remain the same, unless peculiar causes prevent the accustomed course of things, and produce monsters: but this very rarely happens. Hence it is that the leading features or the external parts agree with the internal properties, and, when judiciously chosen, form sufficient characteristic distinctions.

§ 6.—But the formation of fossils is totally different. Here no system of vessels collects, distributes, secretes, or changes the concurrent particles, but they run together by chance, and are solely connected by the power of attraction;

they are generally, too, of different kinds, rare and dense, figured and shapeless, admitting of every possible variety. This general view of the subject shows us how little external characters can be depended on; but we shall more particularly consider the principal of these.

§ 7.—COLOUR varies exceedingly, as does also the size of bodies. We cannot sufficiently wonder at the violence done to nature by the studied separation of earths from stones. The consequence is, that a stone of a certain size must constitute one genus, whilst the same thing, reduced to powder, must be placed under another genus, which shall not be found even in the same class.

§ 8.—HARDNESS not unfrequently varies even in the same specimen. Soft clay dries in the fire, and, at length, acquires the hardness of flint. Steatites, *(soap-rock,)* which may be scraped with the nail, and many other matters, harden in the same manner, and that sometimes without any notable loss of weight; so that bodies pass through every different degree of hardness, without any other change of their mixture.

§ 9.—TEXTURE and external form of the particles may seem, at first sight, to depend more upon the constituent parts; but a calcareous particle, globular or shapeless, is found, upon the most scrupulous examination, to possess the same properties as a piece of spar; and in another place I have clearly shown that the schirl-like, garnet-like, hyacinthine, twelve-sided, and other figures, are not unfrequently formed by nature out of the same materials.* And if we are liable to deception where so great a difference in external forms exists, what can we expect from less constant external qualities?

§ 10.—Superficial characters are therefore insufficient. They cannot even enable us to distinguish calcareous from other earths, for the effervescence with acids is a chymical mark, and happens, too, in matters of very different natures. To pass over other instances, let him who is able distinguish the *plumbum aëratum* and *plumbum phosphoratum* (§ 182 § 183) by external appearances only!

§ 11.—But let us not altogether despise external characters: it is of moment to know and mark them well.† They frequently enable the accustomed eye without troublesome trials to acquire a degree of certainty, which wants only a few select experiments to confirm it. Sometimes also the use depends upon external properties, evident to our senses, as the hardness, the colour, the pellucidity, &c. These, therefore, may with propriety be joined to those which point out the constituent principles.

---

* Opusc. Chymica, vol. ii. p. 2–10.

† Consult particularly Professor WERNER'S treatise on the *external characters of fossils,* printed in German, in the year 1774.

§ 12.—Classes, Genera, and Species are therefore to be formed upon the internal nature and composition; the varieties upon the external appearances. In such a system both methods conveniently agree.

§ 13.—CRONSTEDT first attempted this method, and with great success; but afterwards the *liquid analysis*, in which the illustrious MARGRAAF took the lead, better opened the internal secrets of nature; so that the excellent work of Cronstedt now appears to contain many errors; these however are not to be attributed to any fault in the author, but to the insufficiency of his experiments. The attempts of Mr. Pott by fusion have long been known; but these, however useful in other respects, rather tend to confound than to lay open the component parts of bodies.

§ 14.—In methodizing fossils, *compounds should rank under the most abundant ingredient*. Thus let *a* and *b* represent the component parts; if the former be the heavier, the compound must be placed under the genus of that: but this rule admits of several exceptions.

§ 15.—Thus, the *properties of all ingredients are not of the same intensity*, if I may be allowed the expression; some are more powerful or efficacious, so as to impress the mass with their own genus and character, though forming *less* than half the weight. In such a case, the qualities are rather to be considered than the quantity, especially if b so far from preponderating hardly ever amounts to half the weight.

§ 16.—Argillaceous earth *(earth of alum)* and magnesia are never found separate, but almost always mixed with other things so that their weight constitutes the smaller part of the mass: therefore, if the above rule (§ 14) was rigorously adhered to, these primitive earths would not be found amongst the Genera, which would doubtless be an absurdity.

§ 17.—The *value* of a thing must likewise be considered. Minerals containing gold or silver must be ranked with those noble metals, although they hold three, four, or more times the quantity of heterogeneous matter. Not to mention other examples, pyrites are placed under the genus copper, although they contain a much greater quantity of iron. This custom, established with the universal consent of mineralogists, wants indeed a natural foundation, but it seems useful to miners to retain it, and the more so as it is certain that otherwise many minerals would be to be sought for under strange and improper titles.

§ 18.—Lastly, it must be remarked, that *the solid ingredient determines the genus,* although the menstruum be greater in quantity. Thus in magnesia vitriolata *(Epsom salt)* the earth gives the generic name, although the vitriolic acid be the more ponderous. The same holds good in gypsum, alum, &c.

CLASSES OF FOSSILS.

§ 19.—Fossils are of four kinds:—viz. *saline*, *earthy*, *inflammable*, and *metallic;* hence arise four classes.

§ 20.—Salts, or saline substances, are more or less sapid, and, when finely powdered, dissolve in at least 1000 times their weight of boiling water. They melt in the fire, which, for the most part, changes or destroys them.*

§ 21.—Earths are insipid, not soluble in water, in the degree mentioned above (§ 20);

---

* The latter part of this definition does not apply perfectly well to some of the simple salts. I shall, therefore, offer another, given by Dr. Cullen:—viz. " *Saline bodies* are sapid, miscible with water, and not inflammable." I am sensible, too, that this definition is not perfectly unexceptionable, since it has been found that vol. alkali, in an aërial state, is, in a certain degree, inflammable. W.

though, perhaps, water in Papin's digester will dissolve some if not all of them, especially if their surface be greatly increased by a previous solution in, and precipitation from, some other menstruum. In the chain of nature, they are, by insensible gradation, joined to the salts, so as not to be distinguished without artificial limits. Their form is not changed by a moderate heat, nor are they dissipated by a violent one. Their specific gravity is to water less than 5 to 1.

§ 22.—INFLAMMABLE fossils abound with phlogiston, do not unite with water, but, when pure, dissolve in oils; exposed to the fire, they smoke, generally inflame, are for the most part consumed, and sometimes totally vanish.

§ 23.—METALS, when perfect, do not dissolve at all in water; only a few of them in oils, and then only when in part deprived of their phlogiston. They are the heaviest of all known substances; the lightest of them weighing more than six times its bulk of water.

They melt in the fire with a shining surface, and in clay vessels the surface is convex.

CLASS I.—SALTS.

§ 24.—We begin with the nature and properties of saline bodies, for unacquainted with these our knowledge of other bodies must be exceedingly imperfect. *Native salts* are either *acid, alkaline, neutral, earthy,* or *metallic.*

§ 25.—Acids may be distinguished by their proper taste; they effervesce with mild alkalies; and change the blue juices of vegetables and tincture of heliotropium to a red colour.*

We are acquainted with many species of acids, but they are hardly ever found pure in the bowels of the earth, nor can we expect to find them so when we consider how soon such powerful menstrua must meet with substances to saturate them. Their great abundance and their properties show their various and indispensable uses in the economy of nature.

§ 26.—As Mineralogy treats of those bodies which are found under the surface of the earth, and as acids in an uncombined state are not found there, it would seem proper to exclude them; but the same reason would likewise exclude the primitive earths, some of which have never yet been found pure. Therefore, in a system formed upon the component parts of bodies, a short description of the principal of these is not to be dispensed with, although they hardly ever present themselves in a separate state.

---

* As the tincture of heliotropium is the nicest known test of the presence of an acid, it may not be amiss to mention that it may be had from dyers under the name of *litmus.* It is very cheap, and generally requires to be greatly diluted with distilled water before it can be used. W.

§ 27.—*Vitriolic* Acid. When most concentrated by artificial means, its specific gravity is 2,125. When pure, has neither colour nor smell. Cold sometimes, though very rarely, concretes it into a solid form; it may be coagulated by nitrous air. This, as well as the other acids, is best known from the compounds it forms with other substances.

Mr. Vandelli* says that it is sometimes mixed with the streams from the hills in the neighbourhood of Sienna and Viterbo, raised no doubt by subterranean fires; but in general it is united to alkalies, (§§ 44, 47, 50,) to earths, (§§ 58, 59, 63, 67,) to metals, (§§ 69, 70, 72, 73,) or to phlogiston, (§§ 134, 136.)

Phlogisticated vitriolic Acid (volatile vitriolic acid) is frequently thrown out by the craters of volcanos; its smell suffocating and penetrating. The union to phlogiston and the matter of heat gives it an aërial form, but does not prevent its union with water.

---

* De Thermis Pativinis.

§ 28.—*Nitrous* Acid is by some excluded from the fossil kingdom, because they suppose it to be produced from the putrefaction of organic bodies. But these bodies when deprived of life are again received among the fossils, from whence their more fixed parts were originally derived.

In the most concentrated state that art can procure it, its specific gravity is 1,580. Colourless when pure; but its strong attraction to phlogiston renders particular management necessary to procure it so.* With different proportions of phlogiston it forms phlogisticated acid and nitrous air.

It has never, as far as I know, been met with disengaged, unless, perhaps, in water precipitated out of the atmosphere; but is found united to alkalies (§§ 45, 48, 51), or to earths (§§ 60, 64).

§ 29.—*Muriatic* Acid (spirit of salt) is found in great quantity at, and under, the surface of the earth. The strongest prepared by art hardly attains a specific gravity of 1,150. It has a very peculiar and volatile smell. Deprived of its superfluous water it assumes an aërial form, for phlogiston seems to be one of its constituent parts.†

---

* The most highly coloured and fuming nitrous acid may readily be rendered colourless by boiling it hastily in an open vessel. Part of the acid flies off, carrying the superabundant phlogiston along with it in the form of nitrous air. W.

† N. Acta Ups. vol. ii. p. 202.

It has never been found uncombined, (unless, perhaps, like the nitrous acid in water precipitated from the atmosphere[*],) [†] but united to alkalies (§§ 46, 49, 52), to earths (§§ 61, 65), or to metals (§§ 74, 161, 175, 191).

§ 30.—*Fluor* ACID is obtained by art; its specific gravity never exceeds 1,500; it is very volatile. Its vapours, when hot, corrode glass; and meeting with moisture generate or at least deposit siliceous earth. When deprived of its superfluous water, it assumes an aërial form.[‡] It has never been found disengaged, but united to calcareous earth forming sparry fluor,[‖] (§ 96) and, if I am not mistaken, it enters into the composition of siliceous earths.

§ 31.—*Arsenical* ACID, dry; prepared by art; specific gravity 3,391; fusible and fixed in the fire, until it acquires from the matter of heat so much phlogiston as is necessary to convert it into white arsenic. In a moist air it deliquesces.

It is not found uncombined, but united to calx of cobalt (§ 228), and also to phlogiston, forming a brittle arsenical metal (§ 220) and its calx (§ 222).

---

[*] M. Margraaf.

[†] I have some reason to believe that the Nevil Holt water does contain some of this acid in an uncombined state. W.

[‡] Opuscul. vol. ii. p. 40.

[‖] Called Derbyshire fluor; Cornish fluor, blue John. W.

§ 32.—*Molybdæna* Acid. This is very probably of metallic origin, though it does not yet appear to which metal it belongs. Seeing that arsenic, a brittle metal, by dephlogistication only is changed into an acid, different from all other acids, it is not improbable that other metals may have an acid basis, although their phlogiston adhering more strongly has not yet been completely separated.

How this substance may be obtained by art does not belong to this place to describe;* but that the acid got from molybdæna has a metallic nature, and as yet has not been perfectly freed from phlogiston, is probable from the following considerations:—1, its taste is acid, and, at the same time, metallic: 2, microcosmic salt and borax are coloured by it, and these salts are hardly coloured by any thing but metallic calxes: 3, its decomposition by means of the phlogisticated fixed alkali, which always indicates the presence of a metal: 4, its concrete form, and not deliquescing, analogous to white arsenic: 5, its specific gravity 3,460.—And very lately M. Hielm, by my persuasion, attempted the reduction and obtained a regulus, seemingly different from every other metal, but not yet sufficiently examined.

§ 33.—An acid conjoined to the calx ponderosa *(ponderous calx* or *lime)* is nearly allied to the preceding, but dropped into lime-water produces a different compound, though in a number of other circumstances these two acids agree.* I apprehend that this is likewise of a metallic nature.

---

* D. Scheele Act. Stockh. 1778.

§ 34.—*Phosphoric* ACID evidently exists in the animal kingdom,† much more plentifully in the vegetable, but in the fossil very rare. Mr. J. G. GAHN first detected it united with lead;‡ but probably it may be found in many other fossils. It is fusible in the fire. Its specific gravity when deprived of water 2,687.

§ 35.—*Boracic* ACID, *(acid of borax,* or *sedative salt.)* Many people still think this to be an artificial production, but not long since Mr. HOEFER || found it in a lake near Sienna, in the great duchy of Etruria, and it has long been known to be united to the fossil alkali in native borax. It acts like an acid, though very feebly. It melts in the fire, and volatilizes with water. Its specific gravity is 1,480.

§ 36.—*Amber* ACID is a concrete salt obtained from amber; it acts like a feeble acid. It is yet doubtful whether amber be of vegetable origin; many reckon it fossil.

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* See Monthly Review, Jan. p. 47.

† It has been lately obtained in great abundance from bones. W.

‡ Opusc. Chym. vol. ii. p. 424.

|| De Sale sedativo naturali, 1778.

§ 37.—*Aërial* ACID *(fixed air)* is not only combined with water, but with many other fossil substances, as alkalies (§§ 54, 56), earths (§§ 62, 66), and with some metals (§§ 71, 183, 192, 217, 234, 243). It floats uncombined in the atmosphere. Its specific gravity 0,0018.*

§ 38.—ALKALIES are known by their peculiar lixivial taste, by their vehement attraction to acids, and by their changing the blue colours of vegetables to green. In a pure state, as was before observed of acids, their attraction to other substances is so strong that they cannot long remain uncombined; and if other acids were wanting, the aërial acid, every where present in the atmosphere, would unite with them: therefore, they are always found in a state of combination, unless prepared by art.

§ 39.—New acids are daily detected, but no additions have been made to the three species of alkali long since known.

§ 40.—*Vegetable fixed* ALKALI deprived of every acid is not found on the face of the earth; but it is sometimes met with in combination with the vitriolic acid (§ 44) or the muriatic (§ 46), generally with the nitrous (§ 45), rarely with the aërial (§ 54).

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* It is found in a separate state in large quantities in some of our mines and wells, and is called the *choak damp*. In the famous Grotto del Cani it exists tolerably pure. W.

§ 41.—*Fossil fixed* ALKALI is only found in combination with acids, rarely with the vitriolic (§ 47) or nitrous (§ 48), principally with the muriatic (§ 49), or aërial (§ 55).

§ 42.—*Volatile* ALKALI is frequently found in clays, doubtless in a mild state, for the help of art is required to render it caustic. It is also found united to the vitriolic (§ 50) and the muriatic acids (§ 52).

§ 43.—ACIDS united to *alkalies* form NEUTRAL SALTS. These dissolved in water are no ways disturbed by the addition of an alkali, and generally by evaporation concrete into crystals. If by proper tests they show neither acid nor alkaline properties they are said to be *perfect* neutrals, but *imperfect* when from defect in quantity or strength of one ingredient the peculiar properties of the other more or less prevail.

We now proceed to consider the native salts of both kinds.

NEUTRAL SALTS.

§ 44.—ALKALI *vegetabile vitriolatum* (tartar of vitriol) seldom occurs spontaneously, unless where tracts of wood have been burnt down.

§ 45.—ALKALI *vegetabile nitratum* (common nitre) forms upon the surface of the earth where vegetables, especially when mixed with animal substances, putrify. The alkaline basis previously exists in the plants,* but the origin of the acid is not so well understood: whether it lies concealed in the vegetable acid, and by means of the putrefactive process sufficiently dephlogisticating it, is evolved; or whether the purer part of the atmospheric air contains nitrous acid *fully* saturated with phlogiston, which† upon the alkali being separated by the putrefaction is attracted and extricated by it, and upon losing its inflammable principle assumes its accustomed form. Nature pehraps operates in both ways; the latter however seems clearly confirmed by a very remarkable experiment (§ 60).

As nitre is annually produced in large quantities, it cannot but sometimes be found in springs or wells, as has been observed at Berlin,‡ London,‖ and elsewhere.¶ Sometimes it abounds in such quantities that flesh boiled in these waters turns red.

§ 46.—ALKALI *vegetabile salitum* (digestive salt) is sometimes though rarely met with; generated perhaps by the destruction of animal and vegetable substances.

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* D. D. Margraaf, Weigleb.

† Opusc. Chym. vol. ii. p. 368.

‡ Margraaf Opusc.

‖ Cavendish Phil. Trans. 1767.

¶ Dr. Home, in his Essay on Bleaching, says it is found in coal mines in this island, and a friend assures me that he has obtained it from the water issuing out of coal-pits. W.

§ 47.—ALKALI *minerale vitriolatum* (Glauber's salt) is sometimes found in waters. Some of the lakes in Siberia and Astracan contain it, and many springs in other places.

§ 48.—ALKALI *minerale nitratum* (cubic nitre) rarely occurs but where maritime plants putrify.

§ 49.—ALKALI *minerale salitum* (common salt) plentiful every where as well in the earth, where it forms strata more or less thick (sal gem), as also dissolved in springs and lakes, and in the sea, (sea salt.)

§ 50.—ALKALI *volatile vitriolatum* (vitriolic ammoniac) is scarcely found any where but in places where the phlogisticated fumes of vitriolic acid arise from burning sulphur, and in putrid places are absorbed by the volatile alkali.* Thus at Fahlune the acid vapour from the roasted minerals produces this salt in the necessary houses. It is sometimes also formed in the craters of volcanos.

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* As volatile alkali may be obtained in large quantities from pit coal, and produced by processes not dependent upon putrefaction, there is reason to believe that the vitriolic ammoniac may be formed in several ways not noticed by the author. W.

§ 51.—ALKALI *volatile nitratum* (nitrous ammoniac) is generally found along with common nitre.

§ 52.—ALKALI *volatile salitum* (sal ammoniac or common ammoniac). I have examined some from Vesuvius, and some from the Solfaterra, near Naples.

The salts hitherto enumerated are perfect neutrals, those which follow are imperfect. (§§ 53, 56.)

§ 53.—ALKALI FOSSIL, only in part saturated with a peculiar acid is called tinkal; after depuration, borax. It is dug out of the earth in the kingdom of Thibet.* Borax takes nearly an equal weight of acid before the alkaline properties entirely disappear.†

I believe no one has yet found the acid of borax united either to the vegetable or volatile alkalies.

§ 54.—ALKALI VEGETABILE *aëratum* (mild vegetable alkali) is hardly ever found native, unless in the neighbourhood of woods destroyed by fire.

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* Acta Stockh. 1772.

† From some experiments lately made I found that both tinkal and purified borax, required twice their weight of sedative salt, to neutralize them perfectly, so that they would no longer change vegetable blues to a green. W.

In the year 1774, at Douai, in Flanders, a spring was discovered surrounded by a wall, whose waters, besides other impregnations, contained eleven grains of vegetable alkali in a pint.*

§ 55.—ALKALI MINERALE *aëratum* (mild fossil alkali, natron, the nitre of the ancients) is found plentifully in many places, particularly in Africa and Asia, either concreted into chrystallized strata, or fallen to a powder; or efflorescing on old brick walls, or lastly, dissolved in springs. It frequently originates from decomposed common salt. I am not ignorant that the acid of common salt adheres strongly to its basis so as not to be expelled by fire; but perhaps the vicissitudes of the atmosphere continually acting for ages, may be more powerful. In immense plains covered over with this alkali, scarcely any common salt is found upon the surface, but the deeper you dig the more it is contaminated by it, the common salt being yet undecomposed for want of access of air.

§ 56.—ALKALI VOLATILE *aëratum* (mild volatile alkali) has been found in pump waters in London,† in Lauchstadt,‡ at Frankfort on the

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* Baumé Mem. des sc. etr. tom. iv.

† Phil. Trans. 1767.

‡ Henchel Bethesda port.

Mayne,[*] and copper immersed therein is said to have been dissolved into a blue liquor.

The three alkalies mentioned above as saturated with aërial acid, differ greatly from caustic alkalies, in the mildness of their taste, in their property of chrystallizing, and in their effervescing with acids which expel the aërial acid, but they still change vegetable blues to greens, though not so powerfully as the caustic alkalies do. Therefore, although the subtil aërial acid in other respects gives them neutral properties, yet in this it does it but imperfectly.

§ 57.—The compounds of earths and acids which possess solubility mentioned at § 20, are decomposed and precipitated by mild, but not by phlogisticated alkalies.

§ 58.—TERRA PONDEROSA *vitriolata*, (heavy spar, marmor metallicum, calk) is placed with the earths (§ 89). Terra ponderosa *nitrata*, i.e. terra ponderosa united to the nitrous acid, perhaps exists somewhere, but has never been met with; neither has the terra ponderosa united to the *aërial* acid, yet been found.[†] Terra ponderosa *salita* i.e. terra ponderosa with the *muriatic acid*

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[*] Bomare Dictionaire.

[†] I have lately discovered a specimen of Terra Ponderosa *aërata*, the produce of a mine in this kingdom. It is very pure, and in a large mass. As this substance is a new acquisition to mine-

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Mr. Hielm says* is dissolved in the waters of the lake Vettern and its neighbourhood.

§ 59.—Calx *vitriolata* (gypsum, selenite) is not only found dissolved in various waters, but also in many places forms immense strata. It is placed by all mineralogists amongst the earths, but I think improperly. When burnt it generates heat with water, but in a less degree than lime does.

§ 60.—Calx *nitrata* (nitre of lime, terrene nitre) is sometimes found in water, but very sparingly. It is said that the chalk hills in some parts of France become spontaneously impregnated with nitrous acid, which may be washed out, and after a certain time they will become impregnated with it again.

§ 61.—Calx *salita* (fixed ammoniac) occurs very frequently in waters.

§ 62.—Calx *aërata* (marble, limestone, chalk, spar) is very commonly found dissolved in waters in consequence of an excess of the aërial acid. When it greatly abounds, the water is said to

ralogy, and may be turned to useful purposes in chymistry, I intend shortly to present a more particular account of it to the Royal Society. W.

[*] Conf. Præl. Schefferi, § 188, not. 2.

be hard *(cruda).* By boiling, or by evaporation, it deposits streaks or crusts of calcareous matter.

Calx *aërata* is not soluble in water without an excess of the subtil acid, and therefore might properly be referred to the earths (§ 21).

§ 63.—MAGNESIA *vitriolata* (Epsom salt) is not unfrequent in the waters of England, Bohemia, and other countries. This salt is presently decomposed by lime-water, which circumstance readily distinguishes it from the alk. min. vitriol, or Glauber's salt.

§ 64.—MAGNESIA *nitrata* (magnesia and nitrous acid) is usually found together with nitre.

§ 65.—MAGNESIA *salita* (magnesia and muriatic acid) is found dissolved in various waters, but plentifully in sea water, to which it gives a disagreeable bitterness.

§ 66.—MAGNESIA *aërata* (common magnesia) with an excess of aërial acid it becomes soluble in cold water, otherwise it is scarce soluble at all, and therefore should be classed with the earths. (§ 21.)

§ 67.—ARGILLA *vitriolata* (alum) is sometimes spontaneously generated by the decomposition of pyrites lodged in clay, or in argillaceous schistus.

It is found in a spring at Steckenitz, in Bohemia,[*] in East Bothnia, and elsewhere. What is commonly called *plumose* alum is not a saline substance.

Argilla (clay) united to the *nitrous*, *muriatic*,[†] or aërial acids has not to my knowledge hitherto been found in any waters.

METALLIC SALTS.

§ 68.—The native salts belonging to this division, may be distinguished by the phlogisticated alkali which precipitates them all. The few which have saline properties (§ 20) we shall mention here, referring the rest to the mineralized metals.

§ 69.—Cuprum *vitriolatum* (vitriol of copper, blue vitriol) is found in the mines of Herregrund, Fahlune, and others which contain copper pyrites.

§ 70.—Ferrum *vitriolatum* (vitriol of iron, green vitriol) is formed from the decomposition of the more common pyrites.

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[*] Margraaf Kl. Schrift. tom. ii. p. 191.

[†] I found it in considerable quantity in the Nevil Holt water, when I analyzed it six years ago; and it is probable that the Ballycastle water in Ireland, likewise contains it. W.

§ 71.—Ferrum *aëratum* (iron with aërial acid) dissolved by an excess of acid in the lighter chalybeate waters.

Ferrum *nitratum*, and *salitum* (iron with nitrous and muriatic acids) have never yet been found native.

§ 72.—Niccolum *vitriolatum* (vitriol of Nickel) sometimes exists from the decomposition of sulphureous ores of Nickel.

§ 73.—Zincum *vitriolatum* (vitriol of zinc, white vitriol) is sometimes, though rarely, produced by the decomposition of pseudogalæna, or black Jack, because this substance does not very readily decompose spontaneously.

§ 74.—Manganesium* *salitum* (manganese united to muriatic acid) exists in some waters, according to Mr. Hielm.

Whether manganese be ever united to waters, like iron, by means of an excess of aërial acid, we know not.

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* In the original the word is Magnesium, but it is here changed, by the advice of Dr. Swediaur and the concurrence of professor Bergman, to Manganesium, in order to prevent confusion from its similarity to Magnesia. W.

TRIPLE SALTS.

§ 75.—The compound salts hitherto enumerated are such as are composed of two ingredients only; but sometimes three or more are so united as not to be separated by chrystallization. The vitriols that we are acquainted with are hardly ever pure, and two or three of them sometimes are joined together.

Sometimes likewise it happens that neutral salts join earthy salts, and earthy salts metallic ones. I generally distinguish compound salts according to the number of their principles, whether the same acid be joined to several bases, or the same basis to different acids; or lastly, whether several menstrua and several bases are joined together. Hence arise salts triple, quadruple, &c. which the diligence of after times must illustrate. I subjoin the most remarkable examples of triple and quadruple native salts which have occurred to me.

§ 76.—Alkali Minerale *salitum* (common salt) contaminated by *magnesia salita.* The common salt when pure does not deliquesce, but this degree of purity is seldom found, and in the native fossil production *(sal gem)* never.

§ 77.—Magnesia *vitriolata* (Epsom salt) contaminated by *ferrum vitriolatum*[*] (vitriol of iron).

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[*] Mr. Monnet, de Aquis Mineralibus.

§ 78.—ARGILLA *vitriolata* (alum) native, contaminated by *vitriol of iron.* In the aluminous schistus it sometimes effloresces in a feathery form. Is this the plumose alum of the ancients?

§ 78*.—ARGILLA *vitriolata* (alum) native; contaminated by sulphur and vitriolic acid.

At the places about Wednesbury and Bilston, in Staffordshire, where the coal-pits are on fire, this substance sublimes to the surface, and may be collected in considerable quantity during dry or frosty weather. I cannot be certain that this is a true chymical union, but the eye cannot distinguish the parts. Perhaps the sulphur volatilizes the alum and so becomes intimately mixed with it. The excess of vitriolic acid keeps it in a deliquescent state.

I believe a similar compound substance sublimes at the Solfaterra, near Naples. W.

§ 79.—ARGILLA *vitriolata* (alum) native, contaminated by *vitriol of cobalt.* In the mines of Herregrund and Idra this may be seen, shooting out into long slender filaments. Perhaps this is the *trichitis* of the Greeks. Dissolved in water it immediately betrays the presence of vitriolic acid, upon the addition of terra ponderosa salita (muriatic acid saturated with heavy earth). By the addition of phlogisticated alkali a precipitate of cobalt is thrown down, which makes a blue glass with borax or miscrocosmic salt.

§ 80.—Cuprum *vitriolatum* (vitriol of copper) contaminated by *iron*.

§ 81.—Ferrum *vitriolatum* (vitriol of iron) contaminated by *nickel*.

§ 82.—Cuprum *vitriolatum* (vitriol of copper) and vitriol of iron contaminated by *zinc*. Such is found at Fahlune.

CLASS II.—EARTHS.

§ 83.—Before we can understand the nature of earths, we must know their component parts. Those earths which cannot be further decomposed we call *primitive*, and those which consist of two or more of these intimately united, *derivative*. By this union we do not mean a mere mechanical diffusion, at least not such as can be distinguished by the eye, as is the case in stones, *(saxa.)*

§ 84.—It is evident that the primitive earths will constitute so many natural Genera, and different mixtures of these Species.

They who would make several Genera out of one primitive earth, must separate the glassy, red, white, horny silver ores, and other different compositions into as many Genera, or else act inconsistently with their own principles.

§ 85.—At present we only know five primitive earths. They who reckon fewer, rest their opinions upon fanciful metamorphoses unsupported by faithful experiments.* As experiments teach us that there are five primitive earths, it is evident that the Species arising from the mixture of these cannot exceed twenty-four, viz. ten double (consisting of two earths), six triple, three quadruple, and the five primitive.

Although these different mixtures are possible, and probably do exist, they have not yet been all found. The natural compositions of acids with the earths, forming substances not soluble in one thousand times their weight of boiling water, and which may be called saline earths, must be added to the species, as they are certainly chymical combinations.

§ 86.—The primitive earths hitherto detected are,

TERRA PONDEROSA,	or heavy earth.
CALX, ...	calcareous earth.
MAGNESIA, ...	magnesia.
ARGILLA, ...	argillaceous earth.
TERRA SILICEA:	siliceous earth.

And we must believe these to be primitive, until it shall appear by proper experiments that they may be separated into others still more simple, or changed into one another by art.

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* Opusc. Chym. vol. i. p. 394–399.

These are first to be considered in their greatest simplicity and purity, although nature never presents us with such, nor can they even by art be rendered absolutely free from all heterogeneous mixture. Water and aërial acid readily unite with the four first, and when expelled by fire, a little of the matter of heat is added, and remains until driven out by a more powerful attraction. But in this state they possess a degree of purity not to be attained by any other known method. Therefore it is necessary to examine them when sufficiently burnt, in order to distinguish better what properties depend upon adhering heterogeneous matters.

HEAVY EARTH, OR TERRA PONDEROSA.

§ 87.—To obtain this as pure as possible, the *spathum ponderosum* § 89 (heavy spar) must be reduced to a fine powder, and with equal parts of fixed alkali and charcoal-dust roasted for an hour in a covered crucible. Powder the mass, and add nitrous or muriatic acid diluted until all effervescence ceases, and the liquor be sensibly acid. To this liquor add mild fixed alkali, and the heavy earth will be precipitated in a mild state. If the acids or the alkaline salt contain any vitriolic acid, the heavy spar will immediately be regenerated. What remains undissolved by the acid is heavy spar, not decomposed. The process may be repeated upon this, but the product will then contain some martial earth and some clay from the crucible, therefore the first part will be the most pure.

§ 88.—TERRA PONDEROSA *aërata* (heavy earth) has a specific gravity of 3,773.* 100 parts of it contain about 28 of water, 7 of aërial acid, and 65 of pure earth. It effervesces with acids: with the vitriolic acid forms heavy spar, not soluble in water; with the nitrous and muriatic acids, it yields chrystals, not very readily soluble; but with the vegetable acid the chrystals deliquesce. When free from all contamination of acid or alkali it scarcely melts in the fire, but loses $\frac{35}{100}$ of its weight. When united with the matter of heat, (*i. e.* rendered caustic,) it dissolves in 900 times its weight of water; and when this solution is exposed to the atmosphere, a cream or crust separates at the top, which effervesces with acids. After burning, it unites to acids without effervescence; but heat is produced, and the union is more tardy than when it is in a mild state.†

When caustic, it expels the volatile alkali from sal ammoniac, and forms a hepar with sulphur, the watery solution of which is but imperfectly decomposed by the nitrous or muriatic acids, upon account of the remarkable attraction betwixt this earth and the acid of the sulphur, which it even takes from the vegetable alkali.*

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* The Author speaks here of such as he obtained by precipitation from acids, but the *native* TERRA PONDEROSA *aërata* (see note at page 28) has a specific gravity of nearly 4,338. W.

† Opusc. vol. i. p. 21, 398.

When we compare these properties with those which belong to common calcareous earth, mentioned at (§§ 92, 93) we shall readily see wherein they agree, and wherein they differ.

§ 89.—TERRA PONDEROSA *vitriolata* (heavy spar) is full four times as heavy as an equal bulk of water. It dissolves entirely, though sparingly, in concentrated boiling vitriolic acid, but the addition of a single drop of water occasions a precipitation. The same thing happens to gypsum; but that requires much less acid to dissolve it, and the precipitation is made more slowly. If the heavy spar contained any sulphur, it must certainly have appeared when the whole was dissolved, but I never could find any thing like it.

CRONSTEDT Min. § 18. 2.
Marmor metallicum drusicum. § 19 C. Ponderous Spar.

§ 90.—TERRA PONDEROSA *vitriolata*, impregnated with bitumen, and mixed with gypsum, alum, and siliceous earth.

CRONSTEDT Min. § 24. *Lapis hepaticus.* Liver-stone.

A nucleus of this kind, taken out of a piece of alum ore from Andrarum, in the province of

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* N. Acta Ups. vol. ii. p. 198.

Skone, yielded, in 100 parts, by analysis, 33 of siliceous earth, 29 of caustic heavy earth, earth of alum about 5, and quick-lime from 3 to 7, besides the water and vitriolic acid. By calculation it appears, that these bases, together with vitriolic acid enough to saturate them, ought to weigh 71, which, with the addition of 33, exceeds the amount of the original 100. This increase points out the difference of a mass newly chrystallized, and of one carefully dried.

§ 91.—When we consider that the terra ponderosa was altogether unknown before the year 1774, and that many mineralogists are even now unacquainted with it, we cannot wonder that we know so few species of it. I have scarcely a doubt but the *terra ponderosa aërata* may be found mixed with other earths in many specimens, when they come to be examined by chymical means more accurately than they could be heretofore. (See notes to §§ 58 and 88.)

CALCAREOUS EARTH, OR CALX.

§ 92.—As calcareous earth united to the aërial acid is found native, it requires but little trouble to have it pure. Let selected pieces of chalk, reduced to fine powder, be repeatedly boiled in pure water: this dissolves any calx or magnesia salita which it may contain. This done, it holds no heterogeneous matter but what mechanically adheres to it, the quantity of which is generally extremely small. If we desire to be freed from this likewise, dissolve the washed chalk in distilled vinegar, precipitate with volatile alkali, and after washing the precipitate well, dry it.

§ 93.—The specific gravity of calcareous earth thus purified, is 2,720. 100 parts of it contain about 34 of aërial acid, 11 of water, and 55 of pure earth.

Acids unite with it effervescing, and a centenary (centenarius) excites about 22 degrees of heat. The vitriolic acid forms gypsum, difficult to dissolve (59). The nitrous and muriatic acids form deliquescent salts, (§§ 60, 61,) and the acetous acid permanent chrystals.

Pure calcareous earth does not melt in the fire, but loses $\frac{45}{100}$ of its weight. It dissolves in 700 times its weight of water, generating heat.* Acids dissolve it, producing from a centenary 252 degrees of heat, but without any effervescence. This last circumstance may be best observed by immerging the burnt earth in water, to dissipate a part of the heat, which would otherwise make the acid boil. The water likewise expels the atmospheric air from the pores of the lime. In this situation, if nitrous or muriatic acid be poured upon it, and if it was previously well burnt, no

* Opusc. Chym. vol. i. p. 23.

effervescence will take place. The solution proceeds slowly,* but the saturation becomes as perfect as if the calcareous earth had been in a mild state. This burnt earth, or lime, expels the volatile alkali from sal ammoniac in a caustic state, and it dissolves sulphur; but this compound is separated upon the addition of any acid, even the aërial.

§ 94.—Amongst the native species of this genus, we must first mention the CALX *aërata* (marble, lime-stone, chalk) which constitutes immense strata. Its chief properties are enumerated above (§ 92). It is very rarely found entirely free from iron, which exists even in the purest Icelandic spar, and indeed in almost every fossil production; upon which account only the more remarkable impregnations with iron will be noticed in the following pages.

CRONSTEDT Min. §§ 5–12.

§ 95.—CALX *aërata,* (calcareous earth *mild,)* with more or less *petroleum.* It effervesces with acids, and dissolves; with the vitriolic acid frequently turning brown. Is fœtid when heated or rubbed. The oil is not in sufficient quantity to be collected, by distillation, in drops; it only fouls the inside of the vessels, unless a very great quantity be operated upon. In an open fire the colour presently vanishes, from the petroleum drying up. It generally contains a portion of martial clay.

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* Opusc. Chym. vol. i. p. 398.

Cronstedt Min. §§ 22, 23. *Lapis suillus.* Fœtid stone.

§ 96.—Calx *fluorata,* (calcareous earth and *fluor acid,)* when pure, is wholly soluble in nitrous and muriatic acids. Exposed to heat, below ignition, it emits a phosphorescent light. Fluor acid, dropped into lime-water, precipitates a powder which has all the properties of the calx fluorata. It is sometimes, but not always, contaminated by a small proportion of siliceous earth and muriatic acid.

Cronstedt Min. §§ 97—101. *Sparry fluor.* Blue John.

§ 97.—Calx (calcareous earth) saturated with a *peculiar acid*, perhaps of a metallic nature (§ 33). In acids, particularly in the muriatic, it assumes a remarkable yellow colour, but is not very soluble.

Cronstedt Min. § 210. *Lapis ponderosus.* Tungsten.

§ 98.—Calx *aërata,* (calcareous earth *mild,)* contaminated by a small proportion of *magnesia salita.* Magnesia.

§ 99.—Calx *aërata,* (calcareous earth *mild,)* contaminated by *clay.* Argillaceous.

§ 100.—Calx *aërata,* (calcareous earth *mild,)* contaminated by *siliceous earth.* Siliceous.

§ 101.—Calx *aërata* (calcareous earth *mild)* contaminated by *clay* and *siliceous earth.* (See § 115.)

Cronstedt Min. §§ 25, 28. Calcareous Marle.

§ 102.—Calx *aërata,* (calcareous earth *mild,)* contaminated by *iron* and *manganese.* Martial.

Cronstedt Min. § 30. See also § 203. *Hæmatites.*

§ 103.—There can be no doubt that the four first (§§ 94–97), if not the last (§ 102), are genuine and distinct species; there is some difficulty as to the rest, dependent, perhaps, only upon mechanical mixtures. If the heterogeneous matters can be discerned by the eye, we cannot hesitate to refer the substance to the saxa (stones); but in these the eye cannot discern them. Moreover, we know that the earths have a mutual attraction to each other, and form combinations more intimate than mechanical ones. Earth of alum, precipitated by a caustic alkali, and thrown into lime water, presently loses its pellucid and spongy texture, turns white, and condenses, absorbing the lime from the water, and forming an union not to be separated but by chymical means.

From these considerations, I dare not venture to exclude doubtful species.

We say a thing is *contaminated* by another, when the mixture is of the mechanical kind; but when things are joined by the stronger power of attraction, we say they are *united.*

MAGNESIA.

§ 104.—MAGNESIA, called in the dispensatories, and by apothecaries *magnesia alba*, is a precipitation from its union with vitriolic acid, called Epsom salt. If this earthy precipitate be wanted in the greatest degree of purity, the Epsom salt must be taken chrystallized, and well depurated, dissolved in distilled water, and precipitated by volatile alkali. Let the liquor be boiled for a few minutes, in order that what is kept in solution by the aërial acid may subside.

§ 105.—Magnesia, thus obtained, has a specific gravity of 2,155. 100 parts of it contain about 25 of aërial acid, 30 of water, and 45 of earth.* It dissolves in acids, with a violent effervescence, but without heat. It again forms Epsom salt, with the vitriolic acid; with the nitrous acid it chrystallizes, but the chrystals are deliquescent; with the muriatic and vegetable acids it does not chrystallize, and after drying, greedily attracts moisture from the atmosphere.

It does not melt in a moderate heat, but loses $\frac{55}{100}$ of its weight, and then has no attraction for water; dissolves slowly, even in acids, and that without effervescence, but with some degree of heat. After calcination, it expels the volatile alkali from sal ammoniac, and unites to sulphur, though very feebly.

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* Opusc. Chym. vol. ii. p. 29, 373.

MAGNESIA *aërata* (common magnesia) is never found native and unconnected, unless in waters, when it is dissolved by an excess of aërial acid. (§ 66.)

§ 106.—MAGNESIA *aërata* (common magnesia) united with *siliceous* matter. This effervesces with acids, and not unfrequently strikes fire with steel.

§ 107.—MAGNESIA intimately united with *siliceous* matter. The soluble part is slowly taken up by acids, without effervescence.

CRONSTEDT Min. §§ 79—83, and perhaps § 102—105 also; but I have not yet submitted the asbesti to the liquid analysis.

Soap-rock. Serpentine.

§ 108.—MAGNESIA united to *argillaceous*, *siliceous*, and *pyritical* matters.

M. MONNET discovered this and the next species.

§ 109.—MAGNESIA united to *argillaceous*, *siliceous*, and *pyritical* matters, and likewise contaminated by petroleum.

This species resembles aluminous schistus, but upon examination is found to contain more magnesia than clay.

§ 110.—All the species, except the first, are more or less contaminated by iron, but they do not owe all their colour to this substance. The green colours altogether vanish during ignition, and leave only a white opake mass.

ARGILLACEOUS EARTH, OR ARGILLA.

§ 111.—By earth of alum (argilla) I do not mean common clay, which is never free from siliceous matter, but a pure clay, unmixed, at least, with any other earth. It may be readily obtained by dissolving Roman or roach alum in distilled water, filtering, and precipitating by mild volatile alkali.

§ 112.—The specific gravity of this pure clay, or earth of alum, is 1,305. It dissolves in acids, with a little effervescence. With the vitriolic acid it forms alum; with the nitrous, muriatic, and vegetable acids, deliquescent salts.

When dry, it absorbs water greedily, becomes soft, and, with a due quantity of water, gains such a tenacity, that it may be moulded at pleasure. This mass contracts greatly in the fire, from whence arise numerous cracks; and with a due degree of heat, it becomes hard enough to strike fire with steel. By this burning it loses its glutinous tenacity, and the water is excluded by the approach of the particles; nor does it again assume its former properties, but by solution and precipitation.

It may be dissolved in the dry way, by means of fixed alkaline salt, as well as in the liquid way, by acids. The vitriolic acid is better than the others for this purpose, because more easily concentrated.

Earth of alum neither dissolves sulphur, nor decomposes sal ammoniac.

§ 113.—ARGILLA (argillaceous earth) united to *siliceous* matter only.

CRONSTEDT Min. § 78. *Argilla porcellana.* Porcelain clay. Pipe clay.

I never examined any clay which did not contain a large quantity of siliceous earth; generally more than half its weight.*

§ 114.—ALGILLA (argillaceous earth) united to *siliceous* and *irony* matter.

CRONSTEDT Min. §§ 87 and 90. Bole. Dye-earth. Clay.

§ 115.—ARGILLA (argillaceous earth) united to *siliceous* and *calcareous* matter.

CRONSTEDT Min. § 25. *Marga argillacea.* Marle.

§ 116.—ARGILLA (argillaceous earth) united to *siliceous* earth and *magnesia.*

CRONSTEDT Min. §§ 84, 4. B. Terra lemnia.

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* Professor Bergman does not here seem to be sufficiently aware of the difference between our Devonshire pipe-clay, and that which is used in the manufacture of porcelain. The former, in an open fire, burns to a bluish gray, or pigeon colour; the latter remains white. The former seems to be the same as the Cologne and Maestricht pipe-clay, of Cronstedt, § 78; the latter is a decayed Feldspath, and consequently, according to our author, (§ 130,) contains magnesia. Our porcelain clay, likewise, has quartz chrystals, and mica mixed with it, parts of the granite which it originally composed. Before it is used the quartz is separated, but the mica remains. I am indebted to my friend Mr. Watt for these observations. W.

Its component parts resemble those of talc, but differ in their proportions, and are also less intimately united.

§ 116*.—ARGILLA (argillaceous earth) united to *siliceous*, *calcareous*, and *magnesia* earths.
Lithomarga. (*) CRONSTEDT Min. § 84. A. Stone marrow.

§ 117.—ARGILLA (argillaceous earth) contaminated by *vegetable alkali* and *sulphur*, or at least by the acid of sulphur.
CRONSTEDT Min. § 124. 2. b. Minera aluminis romani.
Alum ore.

It certainly contains vitriolic acid,† and perhaps, also, a small portion of sulphur. The vegetable alkali sufficiently shows its volcanic origin.

§ 118.—ARGILLA (argillaceous earth) contaminated by *siliceous* matter, *pyrites*, and *petroleum*.
CRONSTEDT Min. § 124. 2. c. *Schistus aluminaris.*‡
Alum slate.

§ 119.—ARGILLA (argillaceous earth) intimately united with *less than half its weight of siliceous* earth, and a small quantity of *mild calcareous* earth.
CRONSTEDT Min. §§ 43–48. Gemma.

The Gems suffer no change under the blow-pipe, with fossil fixed alkali, but are dissolved by microcosmic salt and borax.

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* I have taken the liberty to add this species upon the Professor's own authority. See Bergman Diss. de Lithomarga, p. 13.

† N. Acta Upsal. vol. iii. p. 121.

‡ Opusc. vol. i. p. 291, 292.

To this head belong *Rubinus*, . . the ruby;
Saphirus, ... sapphire;
Topazius, ... topaz;
Smaragdus, . . emerald.

The *tourmaline* holds a kind of middle place betwixt the gems and the scherle. The colour, in all of them, is owing to iron.

§ 120. — ARGILLA (argillaceous earth) intimately united to *half its weight of siliceous* earth, (or more,) and a little *mild calcareous* earth.

Scherle.

CRONSTEDT Min. §§ 68–71. *Granatus et Basaltes*, which I call *scherle.*

The remote varieties of these are easily distinguished, the near ones difficultly.

§ 121.—ARGILLA (argillaceous earth) loosely united to half its weight, or more, of *siliceous* earth, and a little *calcareous* earth.

CRONSTEDT Min. §§ 108–112. *Zeolithus.* Zeolite.

There is a great affinity betwixt this and scherle; but in the zeolite, the component parts cohere so loosely, that acids attach and separate them without their being previously treated with alkalies; but this is not the case with the scherles.

Zeolite, contaminated by magnesia, I have not yet examined.

§ 122.—ARGILLA (argillaceous earth) intimately united to a large proportion of *siliceous* earth, and a small proportion of *magnesia*.

CRONSTEDT Min. §§ 93-96. *Mica. Talcum.* * Glimmer. Talc.

SILICEOUS EARTH, OR TERRA SILICEA.

§ 123.—THIS, like the other primitive earths, is seldom found pure. In order to have it so, reduce clear quartz chrystals into powder; melt it with four times the weight of fixed alkali; dissolve the whole in water; precipitate by a large quantity of strong acid; carefully wash and dry the precipitate.

The acid must be used in a superfluous quantity, that any other earths contained may be dissolved.

§ 124.—The specific gravity of this earth is 1,975. The particles, when first precipitated, occupy, in water, at least twelve times the space that they do when dried; so that, when sufficiently fine, they may remain suspended therein; nay, when vehemently heated in a close vessel, they may be dissolved. No acid, except that of fluor spar (§ 30) has any action upon this earth. Fixed alkalies unite with it in the liquid way, but in the dry way they seize it with great vehemence, and convert twice their weight of it into a permanent transparent glass. Such is its affinity to alkalies, that it imparts to clay, which is always loaded with it, the power of separating some of the acid from nitre and common salt. When pure, it is refractory in the fire.

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* It is probable, that in another edition, the Author may see reason to separate the *mica* from the *talc;* as some experiments I have made, though yet too imperfect for publication, seem to indicate the necessity of such a measure. W.

Although siliceous earth is not altogether simple, yet, in mineralogy, it must be considered as primitive, until decisive experiments show us from which of the preceding earths it is derived.*

§ 125.—Terra Silicea (siliceous earth) united to very small quantities of *calcareous* and *argillaceous* earth.

Cronstedt Min. § 51. *Quartzum.* Quartz.

§ 126.—Terra Silicea (siliceous earth) united to *argillaceous* earth.

Cronstedt Min. § 58. *Calcedonius.* Chalcedony.

And perhaps the *Opal*. The *Hydrophanus* is only a variety of these.

Whether the *carnelian*, and other *siliceæ*, of finer or coarser texture, belong to this or the preceding species I cannot yet determine with certainty.

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* Opusc. vol. ii. p. 49.

§ 127.—TERRA SILICEA (siliceous earth) united to an *argillaceous* and highly *martial* earth.
CRONSTEDT Min. §§ 64, 65. *Jaspis.* Jasper.

§ 128.—TERRA SILICEA (siliceous earth) loaded with *martial* earth. Martial.
CRONSTEDT Min. § 53.

This species is often called jasper, but improperly, because it contains no argillaceous earth.

§ 129.—TERRA SILICEA (siliceous earth) united to *argillaceous* and a small quantity of *calcareous* earth.
CRONSTEDT Min. § 63. *Petrosilex.* Chert.

§ 130.—TERRA SILICEA (siliceous earth) united to *argillaceous* earth and a little *magnesia.*
CRONSTEDT Min. § 66. *Feldspathum.* Feld spat.

§ 131.—TERRA SILICEA (siliceous earth) united to *magnesia,* mild *calcareous* earth, *fluor spar* and also to the *calxes* of *copper* and *iron.* Chrysoprasius. I have not examined this, but insert it upon the experiments of Mr. Achard.

To determine accurately the species of earths is the most difficult part of mineralogy, for innumerable analyses yet remain to be made. But that which now seems intricate and obscure will become plain and easy when experiments have been sufficiently multiplied.

CLASS III.

INFLAMMABLES, OR BITUMINA.

§ 132.—To this head we refer all fossils containing phlogiston in such great abundance, that under proper management they are inflammable. The Genera are obviously very few, and, accurately speaking, there is only one Genus. But since phlogiston is so very subtle as not by itself to become the object of our senses, it will perhaps be advisable to consider its more simple combinations as Genera: this has long been done so far as respects the metals, by universal consent.

SULPHUR.

§ 133.—This name may be given to any acid coagulated by phlogiston into a solid form. If all metals consist of certain radical acids saturated with phlogiston, as is highly probable, and with respect to arsenic is indubitably proved, then metals ought to find a place here. But until this theory be established by numerous experiments, we shall only rank under this head the compounds which have not a metallic nature.

§ 134.—PHLOGISTON saturated with *vitriolic acid.*

CRONSTEDT Min. § 151. *Common Brimstone.* Sulphur.

§ 135.—PHLOGISTON saturated with *aërial acid.*

CRONSTEDT Min. § 154. A. *Plumbago.* Blacklead.

The true composition of this has been detected by Mr. Scheele.

§ 136.—PHLOGISTON united to the *acid* of *vitriol* and of *molybdæna;* or, what amounts to the same, sulphur joined to the acid of molybdæna.

CRONSTEDT Min. § 154. b. c. *Molybdæna.* Molybdæna.

The acid of molybdæna has never yet been obtained quite free from phlogiston (§ 32). If this acid be of a metallic origin, molybdæna is a mineralized metallic substance, and should be placed with the other minerals.

PETROLEUM.

§ 137.—PHLOGISTON occurs also in the fossil kingdom, combined in an oily form; but many suppose this derived from the vegetable kingdom.

§ 138.—PETROLEUM pure and selected.

CRONSTEDT Min. §§ 147–150. *Naptha.* Rock Oil.

§ 139.—PETROLEUM joined to *argillaceous* earth.

CRONSTEDT Min. §§ 157–160. *Lithantrax.* Pit Coal.

§ 140.—PETROLEUM united to *acid* of *amber.*

CRONSTEDT Min. §§ 133–146. *Succinum.* Amber.

Many contend that amber has a vegetable origin; but as the point is not very well determined; and as it is found amongst fossils, I still retain it here.

§ 141.—AMBERGRISE, according to the assertion of Mr. Aublett, is nothing more than the juice of a tree inspissated by evaporation into a concrete form. This tree grows in Guyana, and is called Cuma, but has not been investigated by any botanist. Pieces of this tree are said to be carried down into the rivers by heavy rains, and the specimens examined by Mr. Rouelle had the odour and principal qualities of amber.* Rumphius, long since, mentioned a tree called Nanarium, whose juice resembled amber.†

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* Hist. des Plantes de la Gujane. 1774.

† Dr. Swediaur lately presented a paper to the Royal Society, from which it appears highly probable that ambergrise is nothing but the indurated fæces of the spermaceti whale, who feeds upon the cuttle fish. He has found the beaks of that fish intermixed with the ambergrise, in the form of black spots. W.

DIAMOND.

§ 142.—At first sight I may seem to have acted erroneously, by separating this from the other gems, and inserting it here; but after due consideration, I know not where to place it better. It has never yet been decomposed by the liquid analysis;[*] and when exposed to the fire in an open vessel, it is wholly consumed, burning with a lambent flame. This deflagration, though slow, shows decidedly its affinity to the inflammables: besides, in the focus of a burning glass, it leaves traces of soot.[†] When further experiments teach us better, I shall willingly correct my error.

CLASS IV.—METALS.

§ 143.—I have before mentioned the great affinity betwixt metallic and inflammable substances (§ 133). Zinc and arsenic stand, as it were, upon the borders betwixt them; for these, in proper circumstances, burn with a very evident flame. All the metallic substances contain phlogiston, and when, to a certain degree, deprived of it, fall into a powder like an earth; but their attractions for phlogiston are different. Most of them, when melted in a common way, and exposed to the air, have an earthy crust formed upon the surface, which cannot again be reduced to metal without the addition of some inflammable matter. The *base* metals, eleven in number, have this property: but the *noble* metals, platina, gold, and silver, are so firmly connected to the phlogiston, that they never calcine under fusion, however long continued; and after being changed into a calx in the liquid way, when melted in the fire, they re-assume their metallic form, without any other phlogiston than what is contained in the matter of heat.

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[*] Opusc. vol. ii. p. 112.

[†] *Lavoisier*, Mem. de l'Acad. de Paris.

Quicksilver holds a kind of middle place; for, like the base metals, it may be calcined, though not readily; and, like the noble ones it may be reduced by heat alone.

I have placed each division of the metals in the order of their specific gravities.

Those metals, which are found in a perfect metallic state, are called *native;* those united to acids, or to sulphur, are said to be *mineralized;* and those which are only deprived of their phlogiston, *calciform.*[*]

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[*] Opusc. vol. ii. p. 275.

TABLE OF METALS.

METALS.	Specific Gravity.	Melting Heat.*	Saturating Phlogiston.	Attraction to saturating Phlogiston.
Gold	19,640	1301	394	1 or 2
Platina	21,000	——	756	1 or 2
Silver	10,552	1000	100	3
Quicksilver	14,110	39 or 652	74	4
Lead	11,352	595	43	10
Copper	8,876	1450	312	8
Iron	7,800	1601	342	11
Tin	7,264	415	114	9
Bismuth	9,670	494	57	7
Nickel common	7,000	1301	156	11
Nickel pure	9,000	1601		
Arsenic	8,308	——	109	5
Cobalt common	7,700	1450	——	—
Cobalt pure		1601		
Zinc	6,862	699	182	11
Antimony	6,860	809	120	6
Manganese	6,850	very great	227	11

By *saturating phlogiston,* Professor Bergman means to express the proportionate quantities taken away from each metallic substance, when dissolved by means of acids, and of course reduced to a calciform state. The last column only expresses their attractions to this part of their phlogiston, not to that which still remains united to them in a calciform state. W.

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* The degrees of heat here expressed, are according to Farenheit's scale.

AURUM, OR GOLD.

§ 144.—The specific gravity of this metal, when pure, is 19,640. Aqua regia dissolves it; but except the dephlogisticated muriatic acid, and in certain circumstances the nitrous, no simple acid acts upon it, unless it has been previously calcined.* The quantity of phlogiston necessarily taken away in the solution of 100 parts of gold, I estimate at about 394; whilst the same quantity of silver, loses by solution in the nitrous acid, 100.† Gold retains the phlogiston necessary to its metallic form, more obstinately than any other metal, except, perhaps, platina. It melts and calcines in the focus of a burning glass at 1301 degrees of heat.

§ 145.—AURUM *nativum* (gold native) united to *silver*. Native.

I do not know that gold has ever yet been found perfectly pure.

§ 146.—AURUM *nativum* (gold native) united to *copper*. Native.

§ 147.—AURUM *nativum* (gold native) united to *silver* and *copper*. Native.

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* Opusc. vol. ii. p. 374-376.

† Dissertatio de quantitate phlogisti in diversis metallis.

§ 148.—AURUM *nativum* (gold native) united to *silver*, *copper*, and *iron*. Native.

§ 149.—AURUM (gold) mineralized by *sulphur*, by means of iron. Pyritical.

CRONSTEDT Min. § 166. a. *Pyrites aureus.*

But some doubt may be made about the mineralization of gold.*

§ 150.—AURUM (gold) mineralized by *sulphur*, together with *silver*, *lead*, and *iron*.

Minera aurifera Nagyayensis.

I have not yet fully examined this.†

PLATINUM, OR PLATINA.

§ 151.—Its specific gravity is 18,000,‡ when

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[*] Opusc. Chym. vol. ii. p. 411.

[†] Ibid. vol. ii. p. 413.

[‡] From some late experiments made upon platina by the Count de SIKENGEN, and published in German by Professor Succow, it appears that the specific gravity of pure platina is 21,000. When perfectly pure and in its metallic state it was not calcined by deflagration with nitre, it did not admit of being hardened or softened by tempering, like steel or other metals; it was drawn into a wire $\frac{1}{1940}$ of a line in diameter; this wire admitted of being flattened, and had more strength than a wire of gold or silver of the same size. This platina is

very pure. It dissolves in aqua regia, and the loss of phlogiston during the solution, according to the experiments hitherto made may be expressed by 756. Besides the muriatic acid, which when dephlogisticated dissolves every metal, no acid acts upon platina without it has undergone a previous calcination. It seems to retain its phlogiston more obstinately than any other metal. To melt it requires a heat greater than that at which iron melts.

§ 152.—PLATINA *native* united to *iron*. Native. CRONSTEDT Min. § 179.

I believe it has never been found quite free from iron, but this can be separated by art.*

not fusible by the strongest fire, but melts in the focus of a burning glass; its colour white, shining like fine silver.

From considering the very interesting experiments of the Count de Sikengen, I apprehend the following method to obtain pure and malleable platina will be found a good one.

Dissolve the grains of native platina that are least magnetic, in aqua regia. Precipitate the iron by means of phlogisticated fixed alkali. Then precipitate whatever else will fall, by caustic vegetable alkali. Saturate the liquor with caustic fossil alkali, and set it by to chrystallize. The yellow chrystals thus obtained are to be hammered together at a welding heat, and the metallic parts will unite. W.

* Opusc. Chym. vol. ii. p. 181.

ARGENTUM, OR SILVER.

§ 153.—Its specific gravity is 10,552. The nitrous acid readily dissolves it, the vitriolic must be boiling hot; the muriatic attracts its calx very strongly, but cannot remove its phlogiston and therefore cannot dissolve it in its metallic state. The quantity of this phlogiston which causes the difference betwixt its metallic and its calciform state I before expressed as 100 in 100 parts of silver. But the force with which it retains this portion of its phlogiston is less than that of gold; that is, it occupies the third place in a series of all the metals. It melts at 1000 degrees of heat.

§ 154.—Argentum *nativum* (silver native) united to *gold.* Native.

§ 155.—Argentum *nativum* (silver native) united to *copper.* Native.

§ 156.—Argentum *nativum* (silver native) united both to *gold* and *copper.* Native.

§ 157.—Argentum *nativum* (silver native) united to *iron.* Native.

§ 158.—Argentum *nativum* (silver native) united to *arsenic.* Native.
The arsenic hardly exceeds $\frac{6}{100}$.

§ 159. — ARGENTUM *nativum* (silver native) united to *antimony*. Native.

When melted, it smokes but has no smell of arsenic.

§ 160. — ARGENTUM *nativum* (silver native) united to *arsenic* and *iron*. Native.

The three metallic ingredients are nearly in equal proportions.

All the species hitherto mentioned have metallic properties and appearances. The contaminating matters are sometimes extremely small, but not to be neglected when they exceed $\frac{1}{300}$ part of the mass.

§ 161.—ARGENTUM (silver), mineralized by the *vitriolic* and *muriatic* acids. Horn-like.

CRONSTEDT Min. § 177. *Minera argenti cornea.* Horn-silver.

Mr. WOULFE,* detected the presence of the vitriolic acid. The silver seldom exceeds $\frac{70}{100}$. I know not whether it is ever altogether free from vitriolic acid.

§ 162.—ARGENTUM (silver) mineralized by the *vitriolic* and *muriatic* acids, and *sulphur*.

I doubt whether this be a distinct species, since the sulphur and the salts scarcely admit of any other than a mechanical union.

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* Phil. Trans.

§ 163.—ARGENTUM (silver) mineralized by sulphur.
Glassy.

CRONSTEDT Min. § 169. *Minera argenti vitrea.*

It sometimes contains $\frac{75}{100}$ of silver, or more.

§ 164.—ARGENTUM (silver) mineralized by *sulphur* and *iron.*
Marcasitical.

CRONSTEDT Min. § 176, 10. *Pyrites argenteus.*

§ 165.—ARGENTUM (silver) mineralized by *sulphur* and *lead.*
Potters.

CRONSTEDT Min. § 176, 8. *Galena.*

The silver is only a few half ounces in a hundred weight.

§ 166.—ARGENTUM (silver) mineralized by *sulphur* and *arsenic.*
Red.

CRONSTEDT Min. § 170. *Minera argenti rubra.*

It contains about $\frac{70}{100}$ of silver. Iron is frequently present, as in most other species, but not always.

§ 167.—ARGENTUM (silver) mineralized by *sulphur*, *arsenic*, and *iron.*
Glittering.

CRONSTEDT Min. § 172.

I have examined some specimens from Saxony which sometimes contain no silver. May we not therefore suppose that the silver is native and not mineralized?

§ 168.—ARGENTUM (silver) mineralized by *sulphur*, *arsenic*, *iron*, and *cobalt.*

The silver is sometimes more than $\frac{50}{100}$.

§ 169.—ARGENTUM (silver) mineralized by *sulphur*, *arsenic*, *copper*, and *iron*. White ore.

CRONSTEDT Min. § 171. *Minera argenti alba.*

The proportion of silver varies much, sometimes it is $\frac{10}{100}$ or more.

§ 170.—ARGENTUM (silver) mineralized by *sulphur*, *arsenic*, *copper*, *iron*, and *antimony*. Gray ore.

CRONSTEDT Min. § 173. 6. *Minera argenti grisea.* In the province of Dal.[*]

It contains $\frac{24}{100}$ of copper, seldom $\frac{5}{100}$ silver.

§ 171.—ARGENTUM (silver) mineralized by *sulphur*, *arsenic*, *antimony*, and *iron*. Plumose.

CRONSTEDT Min. § 173. 5. *Federertz of the* Germans.[†]

It seldom contains more than a few half ounces of silver in the hundred weight.

It is absurd to found species upon the differences of the matrix: these ought to be considered elsewhere.

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[*] This reference is not to be found in the English edition of Cronstedt. I imagine it should be § 174. 6. where it is called the Dal Falertz. W.

[†] In this reference too I suspect a mistake. It ought I beieve to be 173. 6. W.

HYDRARGYRUM, OR QUICKSILVER.

§ 172.—Its specific gravity is 14,110. It has been erroneously ranked among the brittle metals, for at 652 degrees below 0 it freezes,* and then spreads under the hammer like lead. But as such an extreme degree of cold rarely happens unless artificially produced, we cease to wonder why it is always liquid, or rather melted.

Nitrous acid dissolves it readily, vitriolic acid requires to be assisted by a boiling heat; muriatic acid does not act upon it all, unless previously deprived of as much phlogiston as in 100 parts may be called 74. The attractive power wherewith it retains this portion of phlogiston occupies the fourth place in the series; that is, it holds it less strongly than the noble but more strongly than the base metals.

§ 173.—HYDRARGYRUM *nativum* (quicksilver native). Native.

CRONSTEDT Min. § 217.

Whether it be entirely free from every metallic contamination I have not yet tried.

§ 174.—HYDRARGYRUM (quicksilver) united to *silver*. Amalgamated.

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* Some late experiments made at Hudson's Bay seem to prove that quicksilver congeals and becomes malleable at 39 degrees below 0. See Lond. Med. Journal, page 205, for the year 1783. W.

CRONSTEDT Min. § 217.

§ 175.—HYDRARGYRUM (quicksilver) mineralized by *muriatic* and *vitriolic* acids. Horn-like.

Mineralogy owes the discovery of this to Mr. WOULFE. Phil. Trans.

§ 176.—HYDRARGYRUM (quicksilver) mineralized by *sulphur*. Cinnabarine.

CRONSTEDT Min. § 218. *Cinnabaris.*

§ 177.—HYDRARGYRUM (quicksilver) mineralized by *sulphur* and *iron*. Martial.

I am doubtful whether this be a distinct species. The iron perhaps is only mechanically diffused.

§ 178.—HYDRARGYRUM (quicksilver) mineralized by *sulphur* and *copper*. Cuprous.

CRONSTEDT Min. § 219.

PLUMBUM, OR LEAD.

§ 179.—Its specific gravity is 11,352, greater than that of any other of the base metals. The nitrous acid perfectly dissolves it; the muriatic more difficultly; the vitriolic hardly at all, for the vitriol of lead being insoluble in water incrusts the metal, and prevents its solution. After calcination the weakest vegetable acids dissolve it, and acquire a sweet taste. The phlogiston necessary to be taken away in order that it may dissolve may be called 43, which is less than that of any other metal. Hence we understand why the calx of lead may be reduced with a very minute quantity of inflammable matter. With respect to the force wherewith it retains this phlogiston it occupies the tenth place. It melts at 595 degrees of heat.

§ 180.—PLUMBUM *nativum* (lead), though many mineralogists doubt whether it has ever yet been found. Native.

§ 181.—PLUMBUM (lead) mineralized by *vitriolic acid.* Vitriol of.

Originating from the decomposition of Galena. It is rarely met with. It was first observed by Mr. MONNET. It does not effervesce with acids. It may be reduced by the blow-pipe upon charcoal.

§ 181.*—PLUMBUM (lead) mineralized by *vitriolic acid* and *iron.*

Existing in immense quantity in the island of Anglesea. It does not reduce with the blowpipe upon charcoal, but melts to a black glass.* W.

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* When I introduce a new *species* I repeat the preceding number, with the addition of an asterisk, rather than break in upon the order of the author's numbers. I intend shortly to publish an exact analysis of this substance. W.

§ 182.—PLUMBUM (lead), mineralized by the *acid* of *phosphorus*. Phosphorated.

This was discovered by Mr. GAHN. It does not effervesce with acids. It melts upon charcoal with the blow-pipe, but is not perfectly reduced.

§ 183.—PLUMBUM (lead) mineralized by the *aërial* acid. Aërated.

CRONSTEDT Min. § 185.

It effervesces with acids, and is readily reduced upon charcoal.*

§ 184.—PLUMBUM (lead) mineralized by *sulphur*. Sulphurated.

CRONSTEDT Min. § 187.

§ 185.—PLUMBUM (lead) mineralized by *sulphur* and *silver*. Galena.

CRONSTEDT Min. § 188.

§ 186.—PLUMBUM (lead), mineralized by *sulphur*, with *silver* and *iron*.

CRONTSEDT Min. § 189.

§ 187.—PLUMBUM (lead) mineralized by *sulphur*, with *silver* and *antimony*. Radiated.

CRONSTEDT Min. § 190.

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[*] Opusc. Chym. vol. ii. p. 426.

CUPRUM, OR COPPER.

§ 188.—Its specific gravity is 8,876. Nitrous acid dissolves it readily, muriatic acid slowly, and the vitriolic requires intense boiling. The phlogiston separated in the solution of 100 parts may be expressed by 312. The weakest vegetable acids act upon it, especially after calcination, and so do alkalies, the volatile alkali especially. With respect to the power with which it retains the phlogiston, copper holds the eighth place. It melts with 1450 degrees of heat.

§ 189.—Cuprum *nativum* (copper native). Native.

Cronstedt Min. § 193.

It is rarely found without some alloy of gold, silver, or iron; but I have not yet fully examined it.

§ 190.—Cuprum *calciforme* (copper) simply deprived of its phlogiston. Calciform.

Cronstedt Min. § 195.

§ 191.—Cuprum (copper) mineralized by *muriatic acid* and *argillaceous earth.* Micaceous.

Mr. Werner, in his translation of Cronstedt's Mineralogy, part 1, page 217, has described it accurately, and kindly sent me a specimen of it, which I analysed.*

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* Opusc. vol. ii. p. 431.

§ 192.—CUPRUM (copper) mineralized by the *aërial acid.* Aërated.

CRONSTEDT Min. §§ 194, 196, b. 3.

Mr. FONTANA first pointed out its true composition. It contains about $\frac{2}{3}$ of copper, $\frac{1}{3}$ or $\frac{1}{4}$ of aërial acid, and a little water.*

§ 193.—CUPRUM (copper) mineralized by *sulphur.* Vitreous.

CRONSTEDT Min. § 197. *Minera cupri vitrea;* a common but improper name.

It generally contains some alloy of iron.

§ 194.—CUPRUM (copper) mineralized by *sulphur,* and a small proportion of *iron.*

CRONSTEDT Min. § 198, b. *Minera cupri lazurea.*

By a *small proportion* of iron, I mean less than the weight of the copper, by a large proportion more. This contains from 40 to 50 per cent. of copper.

§ 195.—CUPRUM (copper) mineralized by *sulphur,* and a large proportion of *iron.* Pyritical.

CRONSTEDT Min. § 198. *Pyrites cupri.*

The quantity of copper varies greatly, but seldom exceeds $\frac{40}{100}$.

§ 196.—CUPRUM (copper) mineralized by *sulphur, iron,* and *arsenic.* Gray.

CRONSTEDT Min. § 198. a. *Pyrites cupri griseus.*

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* Opusc. Chym. vol. ii. p. 429.

This frequently contains an alloy of silver. The copper rarely exceeds $\frac{60}{100}$.

FERRUM, OR IRON.

§ 197.—Its specific gravity is 7,800. All the acids readily dissolve it; but the vitriolic must be diluted, otherwise it may be boiled almost to dryness, without effecting it. The phlogiston, dislodged from 100 parts of ductile iron, may, as experiments now stand, be called 342; and this is so feebly retained, that this metal, with a few others, holds the eleventh or lowest place in the series.

It requires an intense degree of heat to fuse it: viz. 1601; if the usual comparison betwixt the mercurial thermometer and the metallic one of Mortimer be true. Iron is red hot at 1050 degrees of heat.

§ 198.—Ferrum *nativum* (iron), *native.* Native. It can hardly be doubted but that the great mass of iron, brought by Pallas from Siberia into Europe, is the product of nature. Its composition resembles that of forged iron; for a centenary of it yields, by means of the muriatic acid, 49 cubic inches of inflammable air; and from many experiments upon ductile iron, that is found to yield from 48 to 51.*

§ 199.—Ferrum *nativum* (iron), *native*, united to arsenic. Arsenical.

Cronstedt Min. § 243. b. *Mispickel.*

§ 200.—Ferrum (iron) with the power of attracting other iron. Loadstone.

Cronstedt Min. § 211. b. *Magnes.*

The cause of this property is yet unknown.

§ 201.—Ferrum (iron) with phlogiston enough to render it magnetic. Magnetic.

Cronstedt Min. §§ 212, 213.

But the quantity of phlogiston is far short of that which is necessary to render it ductile, for a centenary hardly contains more than three cubic inches of inflammable air.

§ 202.—Ferrum *calciforme* (iron calciform) simply deprived of phlogiston. Ochrous.

Cronstedt Min. §§ 202–206. *Bloodstone.*

§ 203.—Ferrum (iron) mineralized by *aërial acid*, *calcareous earth*, and *manganese*. White.

Cronstedt Min. § 30. *Minera ferri alba.*

§ 204.—Ferrum (iron) mineralized by *sulphur.* Pyritical.

Cronstedt Min. § 152. *Pyrites.*

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* Diss. de Analysi Ferri.

§ 205.—Ferrum (iron) intimately united to a new brittle metal,* or to a peculiar modification of iron, rendering it brittle when cold.

Cold-short.

In cold-short iron, a brittle metal exists, readily uniting to ductile iron, by the assistance of heat, but rendering it brittle when cold. This substance, dissolved in acids, forms Prussian blue with phlogisticated alkali, but it is not magnetic: it affords a white calx, richer in phlogiston than the yellow calx of good iron.

I hope, by more experiments, soon to become better acquainted with it.

§ 206.—Ferrum *calciforme* (iron calciform) *phlogisticated* in a peculiar manner. Blue.

Cronstedt Min. § 208. *Cæruleum Berolinense nativum.*

Clay and mould are sometimes coloured superficially by a dilute blue, and sometimes the former, when newly dug up, is found to acquire this colour upon exposure to the air. It is evident that the basis of this colour is an irony matter, full of phlogiston; for by ignition upon a charcoal fire, it flames, turns red, and becomes magnetic. With a gentle heat it becomes green, but when melted gives black scoriæ.

Alkalies as well as acids dissolve it, and the colour vanishes, but appears again, if precipitated from the former by acids, and from the latter by alkalies; but it has then a greenish cast, and soon becomes white. This white sediment, immersed in an infusion of galls, or of tea, recovers its former colour.

---

* Called Sideritis, from its resemblance to iron. W.

From what has been said, it appears that this colour, although analogous to the artificial Prussian blue, differs from it in its intensity, in the mode of its production, and in various properties. It keeps its colour in water, but turns black with oil.

STANNUM, OR TIN.

§ 207.—Its specific gravity is 7,264. Vitriolic, muriatic, acetous acids and aqua regia dissolve it, but the nitrous, especially when strong, attacks it so violently, that it soon reduces it to the state of an insoluble calx.

The quantity of phlogiston it loses by solution, may be called 114; and this it retains with a force that gives it the ninth place in the series. It melts easier than any metal, except quicksilver :—viz. at 415 degrees.

§ 208.—STANNUM *nativum* (tin). Native. This I have not seen. Some doubts are entertained of its true nature, and, perhaps, not without reason.

§ 208.*—Stannum *sulphuratum* (tin), mineralized by *sulphur*. Sulphurated.
[See the Preface.]

§ 209.—Stannum *calciforme* (tin), calciform, contaminated by *iron*. Calciform.

VISMUTUM, or BISMUTH.

§ 210.—The heaviest of all the brittle metals that follow it, its specific gravity being 9,670. Nitrous acid and aqua regia dissolve it perfectly. The vitriolic acid must be boiled nearly to dryness before it acts upon it, and the muriatic acid only attacks its calx. The quantity of phlogiston which resists the action of menstrua is expressed by 57; and its power of retaining it ranks it in the seventh place. It melts at the heat of 494 degrees.

§ 211.—Vismutum *nativum* (bismuth) Native.
Cronstedt Min. § 222.

§ 212.—Vismutum *calciforme* (bismuth).
Calciform.
Cronstedt Min. § 223.
I am not able to say whether this is merely deprived of its phlogiston, or whether it is not also mineralized by aërial acid.

§ 213.—Vismutum (bismuth) mineralized by *sulphur*. Sulphurated.
Cronstedt Min. § 224.

§ 214.—Vismutum (bismuth) mineralized by *sulphur* and *iron* Pyritical.
Cronstedt Min. § 225.

NICCOLUM, OR NICKEL.

§ 215.—The regulus, when depurated, has a specific gravity of 9,000 or more; but the common regulus, obtained by the first reduction, little exceeds 7,000. Aqua regia and nitrous acid dissolve it perfectly; muriatic acid slowly; vitriolic acid not without boiling almost to dryness; and the acetous acid does not act upon it, unless in a calciform state. The quantity of phlogiston separated by solution may be called 156; and this it retains with a force about equal to that with which iron retains its phlogiston (§ 197).

The heat necessary to melt it is about equal to that which gold requires; but when depurated, it is almost as difficult to melt as iron.

The properties of it are more fully examined elsewhere.*

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* Opusc. Chym. vol. ii. p. 231.

§ 216.—Niccolum *nativum* (nickel), native, united to *iron* and *arsenic*. Native. It sometimes, perhaps, contains cobalt. As it contains neither sulphur nor mineralizing acid, and is perfectly in its metallic form, it must be called *native*, although joined to other metals.

§ 217.—Niccolum *aëratum* (nickel) mineralized by *aërial acid.* Aërated.
Cronstedt Min. § 255.

§ 218.—Niccolum (nickel) mineralized by *sulphur*, *arsenic*, *cobalt*, and *iron*. Mineralized.
Cronstedt Min. § 256. Cuprum Nicolai. Kupfer nickel.

ARSENICUM, or ARSENIC.

§ 219.—The specific gravity of the radical acid is 3,391; of white arsenic 3,706; of its glassy state 5000; and its regulus 8,308. Aqua regia and muriatic acid dissolve it perfectly; the vitriolic acid requires boiling; the acetous acts only upon its calx; the nitrous acid not only takes away as much phlogiston as may be expressed by 109, deprived of which the regulus is reduced to the state of a calx, but in a large quantity, assisted by a proper degree of heat, it, at length, so far dephlogisticates this calx, as to leave the acid of arsenic alone. These phenomena are well worthy of observation, as they seem to lay open the nature of metals in general. From analogy, it is probable that every metal contains a radical acid of a peculiar nature, which, with a certain quantity of phlogiston, is coagulated into a metallic calx: but with a larger quantity, sufficient to saturate it, forms a complete metal. The radical acid retains the coagulating phlogiston much more strongly than that which is necessary to the saturation. But different metallic acids retain both with different degrees of attraction. Hence the noble metals cannot be calcined in the dry way; it is only by acid menstrua that they can be brought into that form; but all the others lose their saturating phlogiston in the fire, though with more or less difficulty. I have distinctly observed eleven different degrees of resistance: thus, gold may be precipated by all the other metals, except, perhaps, platina, which I think may thus be explained:—the calx of gold having the greatest attraction for phlogiston takes it from all other metals, and thus losing its solubility falls down in a metallic state: therefore, gold in the series of metals, occupies at least the second place. Platina is precipitated by all, but less evidently than gold: to this, therefore, I think we must give the first place, and so on of the others as I have remarked in the character of each metal. As nickel, cobalt, iron, manganese, and zinc do not precipitate one another, they are put together in the last and eleventh place.*

In order to obtain the radical acids, we must separate them from the coagulating phlogiston. If the industry of chymists ever effects this, I am confident that metallurgy will be wonderfully elucidated. This, therefore, is a task to which our labours must be directed. I know that analogy must be cautiously trusted, but it at least leads us to new experiments. Hitherto this operation has only succeeded with arsenic ; and it is worth notice, that this metal, which holds the fifth place with respect to its quantity of phlogiston, should be inferior to all others with regard to the attraction by which the coagulating quantity is retained.

Arsenic melts, but the moment it suffers heat enough to melt it, it volatilizes, unless it be first calcined. The regulus thrown upon a plate of iron properly heated presently takes fire and calcines, diffusing a smell like garlic.†

§ 220.—ARSENICUM *nativum* (arsenic), native, united to iron. Native.

CRONSTEDT Min. § 239.

I have never found it free from martial impregnation.

§ 221.—ARSENICUM *nativum* (arsenic), native, united to silver.

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* Diss. de quantitate phlogisti in metallis.

† Opusc. Chym. vol. ii. p. 272

§ 222.—Arsenicum *calciforme* (arsenic), deprived of phlogiston. Calciform.
Cronstedt Min. § 240.

§ 223.—Arsenicum (arsenic), mineralized by *sulphur*. Yellow.
Cronstedt Min. § 241. *Auripigmentum. Risigallum.*

§ 224.—Arsenicum (arsenic), mineralized by *sulphur* and *arsenic*. Pyritical.
Cronstedt Min. § 243. A. *Pyrites arsenicalis.*

COBALTUM, or COBALT.

§ 225.—Its specific gravity is 7,700. Nitrous acid and aqua regia readily dissolve it. The vitriolic acid requires to be boiled nearly to dryness. The muriatic and acetous acids do not act upon it unless previously calcined. 270 expresses the quantity of saturating phlogiston, which it retains with the same force that iron does. Common regulus melts in the same heat that copper does, but when well purified it is hardly easier to melt than iron.

§ 226.—Cobaltum *nativum* (cobalt), native and united to *arsenic*. Native.
Cronstedt Min. § 249.

§ 227.—COBALTUM *calciforme* (cobalt). Calciform.

CRONSTEDT Min. § 247.

It is found variously mixed, principally with arsenic, iron, and copper, but whether mechanically or by a more intimate union I know not.

§ 228.—COBALTUM (cobalt), mineralized by acid of *arsenic*. Red.

CRONSTEDT Min. § 248.

The small specimens that I have been able to examine point out such a composition.*

§ 229.—COBALTUM (cobalt), contaminated by *iron* and *vitriolic acid*. Vitriolic.

CRONSTEDT Min. § 250.

§ 230.—COBALTUM (cobalt), mineralized by *sulphur*, *arsenic*, and *iron*. Glanz-cobalt.

CRONSTEDT Min. § 251.

§ 231.—COBALTUM (cobalt), mineralized by *sulphur*, *arsenic*, *iron*, and *nickel*. Kupfernickel.

CRONSTEDT Min. § 252.

ZINCUM, OR ZINC.

§ 232.—Its specific gravity is 6,862. All the acids dissolve it readily and with effervescence, which denotes its very lax union with the inflammable principle, as was remarked before (§ 219). 182 expresses the quantity of phlogiston it loses in solution. It melts in a heat of 699 degrees; and if the heat be a little increased it takes fire; and dissipates in white flowers.*

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* Opusc. Chym. vol. ii. p. 446.

§ 233.—Zincum *calciforme* (zinc), calciform simply deprived of its phlogiston. Calciform.
Cronstedt Min. § 228. A. *Lapis calaminaris.*

It is almost always mixed with clay or calciform iron.

§ 234.—Zincum (zinc), mineralized by *aërial acid.* Aërated.
Cronstedt Min. § 228. A. 1.

§ 235.—Zincum (zinc), with *aërial acid* and mixed with *siliceous* matter. Siliceous.

D. A. Born sent me chrystals of this species, which exposed to the fire gave out aërial acid, but they were not wholly soluble in acids.

§ 236.—Zincum (zinc), mineralized by *sulphur* and *iron.* Black jack.
Cronstedt Min. §§ 229, 230. *Pseudogalena.*

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[*] Opusc. vol. ii. p. 309.

ANTIMONIUM, OR ANTIMONY.

§ 237.—Its specific gravity is 6,860. Aqua regia dissolves it well; vitriolic acid requires boiling; muriatic and acetous acids act hardly at all upon it, unless previously calcined. The nitrous acid corrodes it so as to prevent the solution. The phlogiston it loses in solution is expressed by 120, and with respect to the force wherewith it retains this, it stands in the sixth place. It melts at a heat of 809 degrees.

§ 238.—ANTIMONIUM *nativum* (antimony). Native.

CRONSTEDT Min. § 238.

§ 239.—ANTIMONIUM (antimony), mineralized by sulphur. Sulphurated.

CRONSTEDT Min. § 234.

§ 240.—ANTIMONIUM (antimony), mineralized by sulphur and arsenic. Red.

CRONSTEDT Min. § 235.

MANGANESIUM, OR MANGANESE.

§ 241.—Its specific gravity is 6,850. This new metal is soluble in all the acids, and is so readily deprived of its saturating phlogiston that with iron and some others it stands the lowest in the series. 227 expresses the quantity of phlogiston it loses in solution. It is very difficult to melt, more so than iron.

§ 242.—MANGANESIUM *calciforme* (manganese), simply deprived of phlogiston. Calciform.
CRONSTEDT Min. § 114.

§ 243.—MANGANESIUM (manganese), mineralized by *aërial acid.* Aërated.
CRONSTEDT Min. § 115. I. a.

APPENDIX THE FIRST.

§ 244.—In the preceding pages only the more simple combinations occur, whose principles are either chymically united or at least so subtly interwoven that the texture appears perfectly homogeneous. But if two or more of these species, forming little distinct masses, are cemented together, these mechanical mixtures, discernible by the eye, ought to constitute a new series, to be distinguished by their component parts as the others were by their first principles or chymical elements. Such compositions may well be excluded from the present work, but, upon account of their extensive physical, economical, and metallurgical uses, I propose to give a slight sketch of them here, enumerating the more remarkable genera.

§ 245.—In a general view, it appears that not only several species cemented together may be referred to this place, but likewise those which are mechanically diffused in a powdery or an earthy form.

§ 246.—From the laws of combination it is evident, that, according to the arrangement of fossils into four classes, there can be only TEN Genera composed of two, FOUR of three, and ONE of four constituent parts. And although so many have not yet been detected, yet it is better to mention them here, as the industry of a future age will, probably, discover more. The species are formed from the differences of the more simple species and their component parts.

SALTS *with* SALTS.

§ 247.—This composition can hardly ever constitute a genus, if it must be made in a dry and concrete form; for, excepting gypsum, the other native salts readily dissolve in water, and by evaporation are so mixed together as not readily to be discerned by the eye. Yet the fossil alkali mixed with common salt will, perhaps, find a place here. The contents of mineral waters may likewise be referred here, since every material difference in them depends upon the particles dissolved.

SALTS *with* EARTHS.

§ 248.—This mixture is hardly to be found but where bits of gypsum are concreted to matters of an earthy nature.

SALTS *with* INFLAMMABLES.

§ 249.—May, perhaps, be found in volcanos.

SALTS *with* METALS.

§ 250.—If gypsum forms the matrix of any metal, it must be placed here.

EARTHS *with* EARTHS.

§ 251.—To this head belong most of the *saxa* (stones) enumerated by Mr. Cronstedt, which form the immense bulk of mountains, and deserve our particular attention, in order that, being better acquainted with the nature and structure of the shell of the earth, we may be able to point out the coverings of minerals, and convert them all to our use.

EARTHS *with* INFLAMMABLES.

§ 252.—Lumps of mountain pitch are frequently connected with stones, and sulphureous matters are found diffused through earthy materials.

EARTHS *with* METALS.

§ 253.—This genus contains the peculiar *ma-*

trices of *metals*, a judicious consideration of which would be particularly useful to miners.

INFLAMMABLES *with* INFLAMMABLES.

§ 254.—Perhaps, in some places, sulphureous matters are found mixed with mountain pitch.

INFLAMMABLES *with* METALS.

§ 255.—If plumbago (black lead), or common sulphur, shall ever be found mixed with metallic substances, such species must stand under this genus.

METALS *with* METALS.

§ 256.—We know that some metals in the bosom of the earth are almost always mixed, whilst others are rarely, or never, found together. A more accurate knowledge of these things would illustrate physical geography as well as metallurgy.

We now proceed to the more compound genera.

SALTS *with* EARTHS *and* INFLAMMABLES.

§ 257.—This genus can hardly ever occur but in countries formerly exposed to subterranean fires.*

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* Some of the sulphur and alum, sublimed by the subterranean fires near Bilston, contain siliceous earth.—W.

SALTS *with* EARTHS *and* METALS.

§ 258.—To be expected amongst volcanic productions.

SALTS *with* INFLAMMABLES *and* METALS.

§ 259.—To be sought for in the productions of volcanos.

EARTHS *with* INFLAMMABLES *and* METALS.

§ 260.—Obvious amongst the productions of volcanos, otherwise extremely rare.

SALTS *with* EARTHS, INFLAMMABLES, *and* METALS.

§ 261.—Hardly to be expected but in volcanic mountains.

APPENDIX THE SECOND.

§ 262.—FOSSILS externally resembling animals or vegetables originate from foreign matters, which by some peculiar process are changed in the bosom of the earth, or are so impregnated by mineral particles gradually occupying the place of those which have putrified, that they no longer resemble organic substances, except in figure.—These are commonly called PETREFACTIONS.

§ 263.—The harder shells of animals exposed to the weather are not always exempt from destruction; for their gelatinous matter being gradually destroyed by putrefaction, they become brittle, and in a manner calcined. In less exposed situations, some of them preserve the nature of their materials, but acquire a spar-like texture.

§ 264.—We must carefully distinguish betwixt the foreign bodies themselves, changed or petrified, and their impressions upon the surrounding matrices. Sometimes the body is entirely destroyed, forming a cavity in the surrounding matter, and this cavity afterwards is filled with other materials. Nuclei, or kernels, are likewise found, formed within the cavities of the harder shells, and bearing the form of their internal surface.

§ 265.—I am far from thinking the knowledge of petrefactions is barren and useless. We may, and ought, to consider them as medals deposited by the hand of nature, in memory of the more remarkable changes on the surface of the earth, and from which the time and order of the work may, in some measure, be judged of, whilst other monuments are silent. These, being properly interpreted, show us their native situations in the former state of the surface of the earth, and teach us the unbounded empire of the sea, and the consequent changes. By them we learn to distinguish the ancient and modern foundations of the mineral kingdom; for those which are not formed of petrefactions, and never contain them, are, doubtless, of greater antiquity than animals or vegetables; and, lastly, by their figure they show us the inhabitants of our globe, especially those of the greatest depths of the ocean.

§ 266.—Mr. Cronstedt has admirably arranged the petrefactions; we think it right, therefore, to retain his method. The Genera are built upon the Genera of fossils, and arranged like the four classes thereof; the species upon their species, and the varieties upon the organic substances that have been changed. The following are the Genera hitherto discovered.

SALINE CALCAREOUS EARTH *with an* ORGANIC FORM.

§ 267.—Gypseous petrefactions are very rare.

SALINE IRON *with an* ORGANIC FORM.

§ 268.—Human bodies have sometimes been found indurated and penetrated by vitriol of iron; so likewise have plants, their roots especially. In the open air they moulder away.

MILD CALCAREOUS EARTH *with an* ORGANIC FORM.

§ 269.—This constitutes the substance of most petrefactions.

CLAY *with an* ORGANIC FORM.

§ 270.—It is remarkable, that petrefactions found in clay are compressed, although, in subjacent calcareous strata, they preserve their natural figure. Similar compressed petrefactions are also found in the marly schistus.

SILICEOUS EARTH *with an* ORGANIC FORM.

§ 271.—Siliceous petrefactions are sometimes met with, but, in general, this material forms only nuclei (§ 264). Trunks of trees are sometimes found changed into agate. The celebrated FERBER has seen petrefactions in chert and jasper, and the illustrious BORN mentions corallines (porpitæ) in sinople or martial jasper.

EARTH ORGANIC.

§ 272.—Animals and vegetables are resolved by putrefaction into an earth, which may be regarded as forming a peculiar genus, until every appearance of organization being obliterated, at length it comes to be considered as common earth.

PETROLEUM *impregnating* ORGANIC BODIES.

§ 273.—Wood, penetrated by indurated petroleum, forms a remarkable variety of coal.

SILVER *with an* ORGANIC FORM.

§ 274.—Native silver is sometimes inherent in petrefactions, but never, to my knowledge, constitutes the substance of them, unless mineralized with copper and sulphur.

QUICKSILVER *in an* ORGANIC FORM.

§ 275.—When mineralized by sulphur, it sometimes, though very rarely, constitutes petrefactions.

COPPER *with an* ORGANIC FORM.

§ 276.—Bones and teeth are sometimes found replete with the blue calx of copper. Bits of copper pyrites often stick in petrefactions, but seldom constitute their whole substance. I have some such from Norway, in a matrix of magnetical iron ore.

IRON *with an* ORGANIC FORM.

§ 277.—Calciform iron sometimes is found in the shape of roots and branches of trees. When mineralized by sulphur, it frequently exists in petrefactions, but seldom constitutes the whole mass.

ZINC *with an* ORGANIC FORM.

§ 278.—I have seen pseudo-galena (black jack) in the form of coral.

§ 279.—Some modern writers, as well as Mr. Cronstedt, place the productions of *volcanos* in an appendix by themselves; but, I think, to no good purpose. Things formed by the hand of Nature, whether by a liquid or a dry process, must not be disjoined; for she frequently avails herself of both methods in one and the same instance. And, indeed, the origin of many things is so very doubtful, every vestige thereof being obliterated, that even an Œdipus could not with certainty determine how they were produced. And, on the other hand, many assert, that almost the whole of the mineral kingdom is the product of fire. To avoid error, therefore, it is better to class fossil substances according to their constituent parts, which proper experiments will lay open to us; for we can seldom know their origin or formation.

Homogeneous substances joined together, but not primitive, will find a place among the stones, or elsewhere, in the first appendix.

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AN
ACCOUNT
OF THE
FOXGLOVE,
AND
Some of its Medical Uses:
WITH
PRACTICAL REMARKS ON DROPSY, AND OTHER DISEASES.

PREFACE.

After having been frequently urged to write upon this subject, and as often declined to do so, from apprehension of my own inability, I am at length compelled to take up the pen, however unqualified I may still feel myself for the task.

The use of the Foxglove is getting abroad, and it is better the world should derive some instruction, however imperfect, from my experience, than that the lives of men should be hazarded by its unguarded exhibition, or that a medicine of so much efficacy should be condemned and rejected as dangerous and unmanageable.

It is now about ten years since I first began to use this medicine. Experience and cautious attention gradually taught me how to use it. For the last two years I have not had occasion to alter the modes of management: but I am still far from thinking them perfect.

It would have been an easy task to have given select cases, whose successful treatment would have spoken strongly in favour of the medicine, and perhaps been flattering to my own reputation. But Truth and Science would condemn the procedure. I have, therefore, mentioned every case in which I have prescribed the Foxglove, proper or improper, successful or otherwise. Such a conduct will lay me open to the censure of those who are disposed to censure, but it will meet the approbation of others, who are the best qualified to be judges.

To the Surgeons and Apothecaries, with whom I am connected in practice, both in this town and at a distance, I beg leave to make this public acknowledgement, for the assistance they so readily afforded me, in perfecting some of the cases, and in communicating the events of others.

The ages of the patients are not always exact, nor would the labour of making them so have been repaid by any useful consequences. In a few instances accuracy in that respect was necessary, and there it has been attempted; but in general, an approximation towards the truth was supposed to be sufficient.

The cases related from my own experience are generally written in the shortest form I could contrive, in order to save time and labour. Some of them are given more in detail, when particular circumstances made such detail necessary; but the cases communicated by other practitioners, are given in their own words.

I must caution the reader, who is not a practitioner in physic, that no general deductions, decisive upon the failure or success of the medicine, can be drawn from the cases I now present to him. These cases must be considered as the most hopeless and deplorable that exist; for physicians are seldom consulted in chronic diseases, till the usual remedies have failed: and, indeed, for some years, whilst I was less expert in the management of the Digitalis, I seldom prescribed it, but when the failure of every other method compelled me to do it; so that upon the whole, the instances I am going to adduce, may truly be considered as cases lost to the common run of practice, and only snatched from destruction, by the efficacy of the Digitalis; and this in so remarkable a manner, that, if the properties of that plant had not been discovered, by far the greatest part of these patients must have died.

There are men who will hardly admit of any thing which an author advances in support of a favourite medicine, and I allow they may have some cause for their hesitation; nor do I expect they will wave their usual modes of judging upon the present occasion. I could wish, therefore, that such readers would pass over what I have said, and attend only to the communications from correspondents, because they cannot be supposed to possess any unjust predilection in favour of the medicine: but I cannot advise them to this step, for I am certain they would then close the book, with much higher notions of the efficacy of the plant than what they would have learnt from me. Not that I want faith in the discernment or in the veracity of my correspondents, for they are men of established reputation; but the cases they have sent me are, with some exceptions, too much selected. They are not upon this account less valuable in themselves, but they are not the proper premises from which to draw permanent conclusions.

I wish the reader to keep in view, that it is not my intention merely to introduce a new diuretic to his acquaintance, but one which, though not infallible, I believe to be much more certain than any other in present use.

After all, in spite of opinion, prejudice, or error, TIME will fix the real value upon this discovery, and determine whether I have imposed upon myself and others, or contributed to the benefit of science and mankind.

Birmingham,
1*st July*, 1785.

INTRODUCTION.

THE Foxglove is a plant sufficiently common in this island, and as we have but one species, and that so generally known, I should have thought it superfluous either to figure or describe it, had I not more than once seen the leaves of Mullein* gathered for those of Foxglove. On the continent of Europe, too, other species are found, and I have been informed that our species is very rare in some parts of Germany, existing only by means of cultivation, in gardens.

Our plant is the *Digitalis purpurea*† of Linnæus. It belongs to the 2d order of the 14th class, or the DIDYNAMIA ANGIOSPERMIA. The *essential cha-*

---

* Verbascum of Linnæus.

† The trivial name *purpurea* is not a very happy one, for the blossoms though generally purple are sometimes of a pure white.

racters of the genus are, *Cup with* 5 *divisions. Blossom bell-shaped, bulging. Capsule egg-shaped,* 2-*celled.*—LINN.

DIGITA'LIS *purpu'rea.* Little leaves of the empalement egg-shaped, sharp. Blossoms blunt; the upper lip entire. LINN.

REFERENCES TO FIGURES. These are disposed in the order of comparative excellence.

Curtis Fl. Lond.

Rivini monopet. 104.

Flora Danica, 74, *parts of fructification.*

Tournefort Institutiones. 73, *A*, *E*, *L*, *M*.

Fuchsii Hist. Plant. 893, *copied in*

Tragi stirp. histor. 889.

J. Bauhini histor. vol. ii. 812, 3, *and*

Lonicera 74, 1.

Blackwell. auct. 16.

Dodonæi pempt. stirp. hist. 169, *reprinted in*

Gerard emacul. 790, 1, *and copied in*

Parkinson Theatr. botanic. 653, 1.

Gerard, first edition, 646, 1.

Histor. Oxon. Morison. V. 8, *row* 1. 1.

Flor. Danic. 74, *the reduced figure.*

Blossom. The bellying part on the inside sprinkled with spots like little eyes. *Leaves* wrinkled. LINN.

BLOSSOM. Rather tubular than bell-shaped, bulging on the under side, purple; the narrow tubular part at the base, white. *Upper lip* sometimes slightly cloven.

STAMENS. *Threads* crooked, white. *Tips* yellow.

PISTIL. *Seed-bud* greenish. *Honey-cup* at its base more yellow. *Summit* cloven.

S. VESS. *Capsule* not quite so long as the cup.

ROOT. Knotty and fibrous.

STEM. About four feet high; obscurely angular; leafy.

LEAVES. Slightly but irregularly serrated, wrinkled; dark green above, paler underneath. *Lower leaves* egg-shaped; upper leaves spear-shaped. *Leaf-stalks* fleshy; bordered.

FLOWERS. Numerous, mostly growing from one side of the stem and hanging down one over another. *Floral-leaves* sitting, taper-pointed. The numerous purple blossoms hanging down, mottled within; as wide and nearly half as long as the finger of a common-sized glove, are sufficient marks whereby the most ignorant may distinguish this from every other British plant; and the leaves ought not to be gathered for use but when the plant is in blossom.

STATION. Dry, gravelly, or sandy soils; particularly on sloping ground. It is a biennial, and flowers from the middle of *June* to the end of *July*.

I have not observed that any of our cattle eat it. The root, the stem, the leaves, and the flowers have a bitter herbaceous taste, but I do not perceive that nauseous bitter which has been attributed to it.

This plant ranks amongst the LURIDÆ, one of the Linnæan orders in a natural system. It has for congenera, NICOTIANA, ATROPA, HYOSCYAMUS, DATURA, SOLANUM, &c. so that from the knowledge we possess of the virtues of those plants, and reasoning from botanical analogy, we might be led to guess in some degree at its properties.

I intended in this place to have traced the history of its effects in diseases from the time of Fuchsius, who first described it, but I have been anticipated in this intention by my very valuable friend, Dr. Stokes, of Stourbridge, who has lately sent me the following

Historical View of the Properties of Digitalis.

FUCHSIUS, in his *hist. stirp.* 1542, is the first author who notices it. From him it receives its name of DIGITALIS, in allusion to the German name of *Fingerhut*, which signifies a finger-stall, from the blossoms resembling the finger of a glove.

SENSIBLE QUALITIES. Leaves bitterish, very nauseous. LEWIS *Mat. med.* i. 342.

SENSIBLE EFFECTS. Some persons, soon after eating of a kind of omalade, into which the leaves of this, with those of several other plants, had entered as an ingredient, found themselves much indisposed, and were presently after attacked with vomitings. DODONÆUS *pempt.* 170.

It is a medicine which is proper only for strong constitutions, as it purges very violently, and excites excessive vomitings. RAY. *hist.* 767.

BOERHAAVE judges it to be of a poisonous nature, *hist. plant.* but Dr. ALSTON ranks it among those indigenous vegetables, "which, though now disregarded, are medicines of great virtue, and scarcely inferior to any that the Indies afford." LEWIS *Mat. med.* i. p. 343.

Six or seven spoonfuls of the decoction produce nausea and vomiting, and purge; not without some marks of a deleterious quality. HALLER *hist. n.* 330 from *Aërial Infl.* p. 49, 50.

The following is an abridged Account of its Effects upon Turkeys.

M. SALERNE, a physician at Orleans, having heard that several turkey-pouts had been killed by being fed with Foxglove leaves, instead of mullein, he gave some of the same leaves to a large vigorous turkey. The bird was so much affected that he could not stand upon his legs, he appeared drunk, and his excrements became reddish. Good nourishment restored him to health in eight days.

Being then determined to push the experiment further, he chopped some more leaves, mixed them with bran, and gave them to a vigorous turkey-cock which weighed seven pounds. This bird soon appeared drooping and melancholy; his feathers stared, his neck became pale and retracted. The leaves were given him for four days, during which time he took about half a handful. These leaves had been gathered about eight days, and the winter was far advanced. The excrements, which are naturally green and well formed, became, from the first, liquid and reddish, like those of a dysenteric patient.

The animal refusing to eat any more of this mixture which had done him so much mischief, I was obliged to feed him with bran and water only; but, notwithstanding this, he continued drooping, and without appetite. At times he was seized with convulsions, so strong as to throw him down; in the intervals he walked as if drunk; he did not attempt to perch, he uttered plaintive cries. At length he refused all nourishment. On the fifth or sixth day the excrements became as white as chalk; afterwards yellow, greenish, and black. On the eighteenth day he died, greatly reduced in flesh, for he now weighed only three pounds.

On opening him we found the heart, the lungs, the liver, and gall-bladder shrunk and dried up; the stomach was quite empty, but not deprived of its villous coat. *Hist. de l'Academ.* 1748. p. 84.

Epilepsy.—"It hath beene of later experience found also to be effectual against the falling sicknesse, that divers have been cured thereby; for after the taking of the *Decoct. manipulor. ii. c. polypod. quercin. contus. ℥iv. in cerevisia*, they that have been troubled with it twenty-six years, and have fallen once in a weeke, or two or three times in a moneth, have not fallen once in fourteen or fifteen moneths, that is until the writing hereof." *Parkinson,* p. 654.

Scrophula.—"The herb bruised, or the juice made up into an ointment, and applied to the place, hath been found by late experience to be available for the king's evil." Park. p. 654.

Several hereditary instances of this disease said to have been cured by it. Aerial Influences, p. 49, 50, quoted by Haller, *hist. n.* 330.

A man with *scrophulous ulcers* in various parts of the body, and which in the right leg were so virulent that its amputation was proposed, cured by *succ. express. cochl. i. bis intra xiv. dies, in* $\frac{1}{2}$ *pinta cerevisiæ calidæ.*

The leaves remaining after the pressing out of the juice, were applied every day to the ulcers.

Pract. ess. p. 40, quoted by Murray *apparat. medicam.* i. p. 491.

A young woman with a *scrophulous tumour of the eye,* a remarkable *swelling of the upper lip, and painful tumours of the joints of the fingers,* much relieved; but the medicine was left off, on account of its violent effects on the constitution. *Ib.* p. 42, quoted as above.

A man with a *scrophulous tumour of the right elbow,* attended for three years *with excruciating pains,* was nearly cured by four doses of the juice taken once a month. *Ib.* p. 43, as above.

The physicians and surgeons of the Worcester Infirmary have employed it in ointments and poultices with remarkable efficacy. *Ib.* p. 44. It was recommended to them by Dr. Baylies of Evesham, now of Berlin, as a remedy for this disease. Dr. Wall gave it a trial, as well externally as internally, but their experiments did not lead them to observe any other properties in it, than those of a highly nauseating medicine and drastic purgative.

Wounds. In considerable estimation for the healing all kinds of wounds. *Lobel. adv.* 245.

Principally of use in ulcers, which discharge considerably, being of little advantage in such as are dry. Hulse, in R. hist. 768.

Doctor Baylies, physician to his Prussian

Majesty, informed me, when at Berlin, that he employed it with great success in caries, and obstinate sore legs.

Dyspnœa *Pituitosa*, Sauvages, i. 657.—" Boiled in water, or wine, and drunken doth cut and consume the thicke toughnesse of grosse, and slimie flegme, and naughtie humours. The same, or boiled with honied water or sugar, doth scoure and clense the brest, ripeneth and bringeth foorth tough and clammie flegme. It openeth also the stoppage of the liver spleene and milt, and of the inwarde parts." Gerarde hist. ed. i. p. 647.

" Whensoever there is need of a rarefying or extenuating of tough flegme or viscous humours troubling the chest,—the decoction or juice hereof made up with sugar or honey is availeable, as also to clense and purge the body both upwards and downwards sometimes, of tough flegme, and clammy humours, notwithstanding that these qualities are found to bee in it, there are but few physitions in our times that put it to these uses, but it is in a manner wholly neglected." Parkinson, p. 654.

Previous to the year 1777, you informed me of the great success you had met with in curing dropsies by means of the Fol. Digitalis, which you then considered as a more certain diuretic than any you had ever tried. Some time afterwards, Mr. Russel, surgeon, of Worcester, having heard of the success which had attended some cases in which you had given it, requested me to obtain for him any information you might be inclined to communicate respecting its use. In consequence of this application, you wrote to me in the following terms.*

In a letter which I received from you in London, dated *September* 29, 1778, you write as follows:—" I wish it was as easy to write upon the Digitalis—I despair of pleasing myself or instructing others, in a subject so difficult. It is much easier to write upon a disease than upon a remedy. The former is in the hands of nature, and a faithful observer, with an eye of tolerable judgement, cannot fail to delineate a likeness. The latter will ever be subject to the whims, the inaccuracies, and the blunders of mankind."—

In my notes I find the following memorandum, —" *February* 20th, 1779, gave an account of Doctor Withering's practice, with the precautions necessary to its success, to the Medical Society at Edinburgh."—In the course of that year, the Digitalis was prescribed in the Edinburgh Infirmary, by Dr. Hope, and in the following year, whilst I was clerk to Dr. Home, as Clinical Professor, I had a favourable opportunity of observing its sensible effects.

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[*] See the extract from this letter at p. 5.

In one case in which it was given properly at first, the urine began to flow freely on the second day. On the third, the swellings began to subside. The dose was then increased more than *quadruple* in the twenty-four hours. On the fifth day sickness came on, and much purging, but the urine still increased though the pulse sunk to 50. On the seventh day, a *quadruple* dose of the infusion was ordered to be taken every third hour, so as to bring on nausea again. The pulse fell to forty-four, and at length to thirty-five in a minute. The patient gradually sunk and died on the sixteenth day; but previous to her death, for two or three days, her pulse rose to near one hundred.— It is needless to observe to you, how widely the treatment of this case differed from the method which you have found so successful.

AN
ACCOUNT
OF THE
INTRODUCTION OF FOXGLOVE
INTO
MODERN PRACTICE.

As the more obvious and sensible properties of plants, such as colour, taste, and smell, have but little connexion with the diseases they are adapted to cure; so their peculiar qualities have no certain dependence upon their external configuration. Their chymical examination by fire, after an immense waste of time and labour, having been found useless, is now abandoned by general consent. Possibly other modes of analysis will be found out, which may turn to better account; but we have hitherto made only a very small progress in the chymistry of animal and vegetable substances. Their virtues must therefore be learnt, either from observing their effects upon insects and quadrupeds; from analogy, deduced from the already known powers of some of their congenera, or from the empirical usages and experience of the populace.

The first method has not yet been much attended to; and the second can only be perfected in proportion as we approach towards the discovery of a truly natural system; but the last, as far as it extends, lies within the reach of every one who is open to information, regardless of the source from whence it springs.

It was a circumstance of this kind which first fixed my attention on the Foxglove.

In the year 1775, my opinion was asked concerning a family receipt for the cure of the dropsy. I was told that it had long been kept a secret by an old woman in Shropshire, who had sometimes made cures after the more regular practitioners had failed. I was informed also, that the effects produced were violent vomiting and purging; for the diuretic effects seemed to have been overlooked. This medicine was composed of twenty or more different herbs; but it was not very difficult for one conversant in these subjects, to perceive, that the active herb could be no other than the Foxglove.

My worthy predecessor in this place, the very humane and ingenious Dr. Small, had made it a practice to give his advice to the poor during one hour in a day. This practice, which I continued until we had an hospital opened for the reception of the sick poor, gave me an opportunity of putting my ideas into execution in a variety of cases; for the number of poor who thus applied for advice, amounted to between two and three thousand annually. I soon found the Foxglove to be a very powerful diuretic; but then, and for a considerable time afterwards, I gave it in doses very much too large, and urged its continuance too long; for misled by reasoning from the effects of the squill, which generally acts best upon the kidneys when it excites nausea, I wished to produce the same effect by the Foxglove. In this mode of prescribing, when I had so many patients to attend to in the space of one, or at most of two hours, it will not be expected that I could be very particular, much less could I take notes of all the cases which occurred. Two or three of them only, in which the medicine succeeded, I find mentioned amongst my papers. It was from this kind of experience that I ventured to assert, in the "Botanical Arrangement" published in the course of the following spring, that the Digitalis purpurea "merited more attention than modern practice "bestowed upon it."

I had not, however, yet introduced it into the more regular mode of prescription; but a circumstance happened which accelerated that event. My truly valuable and respectable friend, Dr. Ash, informed me that Dr. Cawley, then principal of Brazen Nose College, Oxford, had been cured of a Hydrops Pectoris, by an empirical exhibition of the root of the Foxglove, after some of the first physicians of the age had declared they could do no more for him. I was now determined to pursue my former ideas more vigorously than before, but was too well aware of the uncertainty which must attend on the exhibition of the *root* of a *biennial* plant, and therefore continued to use the *leaves.* These I had found to vary much as to dose, at different seasons of the year; but I expected, if gathered always in one condition of the plant, viz. when it was in its flowering state, and carefully dried, that the dose might be ascertained as exactly as that of any other medicine; nor have I been disappointed in this expectation. The more I saw of the great powers of this plant, the more it seemed necessary to bring the doses of it to the greatest possible accuracy. I suspected that this degree of accuracy was not reconcileable with the use of a *decoction*, as it depended not only upon the care of those who had the preparation of it, but it was easy to conceive from the analogy of another plant of the same natural order, the tobacco, that its active properties might be impaired by long boiling. The decoction was therefore discarded, and the *infusion* substituted in its place. After this I began to use the leaves in *powder*, but I still very often prescribe the infusion.

Further experience convinced me, that the *diuretic* effects of this medicine do not at all depend upon its exciting a nausea or vomiting; but, on the contrary, that though the increased secretion of urine will frequently succeed to, or exist along with these circumstances, yet they are so far from being friendly or necessary, that I have often known the discharge of urine checked, when the doses have been imprudently urged so as to occasion sickness.

If the medicine purges, it is almost certain to fail in its desired effect; but this having been the case, I have seen it afterwards succeed when joined with small doses of opium, so as to restrain its action on the bowels.

In the summer of the year 1776, I ordered a quantity of the leaves to be dried, and as it then became possible to ascertain its doses, it was gradually adopted by the medical practioners in the circle of my acquaintance.

In the month of *November*, 1777, in consequence of an application from that very celebrated surgeon, Mr. Russel, of Worcester, I sent him the following account, which I choose to introduce here, as showing the ideas I then entertained of the medicine, and how much I was mistaken as to its real dose:

" I generally order it in decoction. Three drams of the dried leaves, collected at the time of the blossoms expanding, boiled in twelve to eight ounces of water. Two spoonfuls of this medicine, given every two hours, will sooner or later excite a nausea. I have sometimes used the green leaves gathered in winter, but then I order three times the weight; and in one instance I used three ounces to a pint decoction before the desired effect took place. I consider the Foxglove thus given, as the most certain diuretic I know, nor do its diuretic effects depend merely upon the nausea it produces, for in cases where squill and ipecac. have been so given as to keep up a nausea several days together, and the flow of urine not taken place, I have found the Foxglove to succeed; and I have, in more than one instance, given the Foxglove in smaller and more distant doses, so that the flow of urine has taken place without any sensible affection of the stomach; but in general I give it in the manner first mentioned, and order one dose to be taken after the sickness commences. I then omit all medicines, except those of the cordial kind are wanted, during the space of three, four, or five days. By this time the nausea abates, and the appetite becomes better than it was before. Sometimes the brain is considerably affected by the medicine, and indistinct vision ensues; but I have never yet found any permanent bad effects from it.

" I use it in the Ascites, Anasarca, and Hydrops Pectoris; and so far as the removal of the water will contribute to cure the patient, so far may be expected from this medicine; but I wish it not to be tried in ascites of female patients, believing that many of these cases are dropsies of the ovaria; and no sensible man will ever expect to see these encysted fluids removed by any medicine.

" I have often been obliged to evacuate the water repeatedly in the same patient, by repeating the decoction: but then this has been at such distances of time as to allow of the interference of other medicines and a proper regimen, so that the patient obtains in the end a perfect cure. In these cases the decoction becomes at length so very disagreeable, that a much smaller quantity will produce the effect, and I often find it necessary to alter its taste by the addition of Aq. Cinnam. sp. or Aq. Juniper. composita.

" I allow, and indeed enjoin my patients to drink very plentifully of small liquors through the whole course of the cure; and sometimes, where the evacuations have been very sudden, I have found a bandage as necessary as in the use of the trochar."

Early in the year 1779, a number of dropsical cases offered themselves to my attention, the consequences of the scarlet fever and sore throat which had raged so very generally amongst us in the preceding year. Some of these had been cured by squills or other diuretics, and relapsed; in others, the dropsy did not appear for several weeks after the original disease had ceased: but I am not able to mention many particulars, having omitted to make notes. This, however, is the less to be regretted, as the symptoms in all were very much alike, and they were all without an exception cured by the Foxglove.

This last circumstance encouraged me to use the medicine more frequently than I had done heretofore, and the increase of practice had taught me to improve the management of it.

In *February*, 1779, my friend, Dr. Stokes, communicated to the Medical Society at Edinburgh the result of my experience of the Foxglove; and, in a letter addressed to me in *November* following, he says, " Dr. Hope, in consequence of my mentioning its use to my friend, Dr. Broughton, has tried the Foxglove in the Infirmary with success." Dr. Stokes also tells me that Dr. Hamilton cured Dropsies with it in the year 1781.

I am informed by my very worthy friend Dr. Duncan, that Dr. Hamilton, who learnt its use from Dr. Hope, has employed it very frequently in the Hospital at Edinburgh. Dr. Duncan also tells me, that the late very ingenious and accomplished Mr. Charles Darwin, informed him of its being used by his father and myself, in cases of Hydrothorax, and that he has ever since mentioned it in his lectures, and sometimes employed it in his practice.

At length, in the year 1783, it appeared in the new edition of the Edinburgh Pharmacopœia, into which, I am told, it was received in consequence of the recommendation of Dr. Hope. But from which, I am satisfied, it will be again very soon rejected, if it should continue to be exhibited in the unrestrained manner in which it has heretofore been used at Edinburgh, and in the enormous doses in which it is now directed in London.

In the following cases the reader will find other diseases besides dropsies; particularly several cases of consumption. I was induced to try it in these, from being told, that it was much used in the West of England, in the Phthisis Pulmonalis, by the common people. In this disease, however, in my hands, it has done but little service, and yet I am disposed to wish it a further trial, for in a copy of Parkinson's Herbal, which I saw about two years ago, I found the following manuscript note at the article Digitalis, written, I believe, by a Mr. Saunders, who practised for many years with great reputation as a surgeon and apothecary at Stourbridge, in Worcestershire.

"Consumptions are cured infallibly by weak decoction of Foxglove leaves in water, or wine and water, and drank for constant drink. Or take of the juice of the herb and flowers, clarify it, and make a fine syrup with honey, of which take three spoonfuls thrice in a day, at physical hours. The use of these two things of late has done, in consumptive cases, great wonders. But be cautious of its use, for it is of a vomiting nature. In these things begin sparingly, and increase the dose as the patient's strength will bear, least, instead of a sovereign medicine, you do real damage by this infusion or syrup."

The precautions annexed to his encomiums of this medicine lead one to think that he has spoken from his own proper experience.

I have lately been told, that a person in the neighbourhood of Warwick, possesses a famous family receipt for the dropsy, in which the Foxglove is the active medicine; and a lady from the western part of Yorkshire assures me, that the people in her country often cure themselves of dropsical complaints by drinking Foxglove tea. In confirmation of this, I recollect about two years ago being desired to visit a travelling Yorkshire tradesman. I found him incessantly vomiting, his vision indistinct, his pulse forty in a minute. Upon inquiry it appeared that his wife had stewed a large handful of green Foxglove leaves in half a pint of water, and given him the liquor, which he drank at one draught, in order to cure him of an asthmatic affection. This good woman knew the medicine of her country, but not the dose of it, for her husband narrowly escaped with his life.

It is probable that this rude mode of exhibiting the Foxglove has been more general than I am at present aware of; but it is wonderful that no author seems to have been acquainted with its effects as a diuretic.

CASES,

In which the Digitalis was given by Direction of the Author.

1775.

It was in the course of this year that I began to use the Digitalis in dropsical cases. The patients were such as applied at my house for advice gratis. I cannot pretend to charge my memory with particular cases, or particular effects, and I had not leisure to make notes. Upon the whole, however, it may be concluded, that the medicine was found useful, or I should not have continued to employ it.

Case I.—*December* 8th. A man about fifty years of age, who had formerly been a builder, but was now much reduced in his circumstances, complained to me of an asthma which first attacked him about the latter end of autumn. His breath was very short, his countenance was sunken, his belly large; and upon examination, a fluctuation in it was very perceptible. His urine for some time past had been small in quantity. I directed a decoction of Fol. Digital. recent. which made him very sick, the sickness recurring at intervals for several days, during which time he made a large quantity of water. His breathing gradually became easier, his belly subsided, and in about ten days he began to eat with a keen appetite. He afterwards took steel and bitters.

1776.

CASE II.—*January* 14th. A poor man labouring under an ascites and anasarca, was directed to take a decoction of Digitalis every four hours. It purged him smartly, but did not relieve him. An opiate was now ordered with each dose of the medicine, which then acted upon the kidneys very freely, and he soon lost all his complaints.

CASE III.—*March* 15th. A poor boy, about nine years of age, was brought for my advice. His countenance was pale, his pulse quick and feeble, his body greatly emaciated, except his belly, which was very large, and, upon examination, contained a fluid. The case had been considered as arising from worms. He was directed to take the decoction of Digitalis night and morning. It operated as a diuretic, never made him sick, and he got well without any other medicine.

Case IV.—*July* 25th. Mrs. H———, of A———, near N———, between forty and fifty years of age, a few weeks ago, after some previous indisposition, was attacked by a severe cold shivering fit, succeeded by fever; great pain in her left side, shortness of breath, perpetual cough, and, after some days, copious expectoration. On the 4th of *June*, Dr. Darwin,* was called to her. I have not heard what was then done for her, but, between the 15th of *June*, and 25th of *July*, the Doctor, at his different visits, gave her various medicines of the deobstruent, tonic, antispasmodic, diuretic, and evacuant kinds.

On the 25th of *July* I was desired to meet Dr. Darwin at the lady's house. I found her nearly in a state of suffocation; her pulse extremely weak and irregular, her breath very short and laborious, her countenance sunk, her arms of a leaden colour, clammy and cold. She could not lie down in bed; and had neither strength nor appetite, but was extremely thirsty. Her stomach, legs, and thighs, were greatly swollen; her urine very small in quantity, not more than a spoonful at a time, and that very seldom. It had been proposed to scarify her legs, but the proposition was not acceded to.

She had experienced no relief from any means that had been used, except from ipecacuanha vomits; the dose of which had been gradually increased from 15 to 40 grains, but such was the insensible state of her stomach for the last few days, that even those very large doses failed to make her sick, and consequently purged her. In this situation I knew of nothing likely to avail us, except the Digitalis: but this I hesitated to propose, from an apprehension that little could be expected from any thing; that an unfavourable termination would tend to discredit a medicine which promised to be of great benefit to mankind, and I might be censured for a prescription which could not be countenanced by the experience of any other regular practitioner. But these considerations soon gave way to the desire of preserving the life of this valuable woman, and accordingly I proposed the Digitalis to be tried; adding, that I sometimes had found it to succeed when other, even the most judicious methods, had failed. Dr. Darwin very politely acceded immediately to my proposition, and, as he had never seen it given, left the preparation and the dose to my direction. We therefore prescribed as follows:

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* Then resident at Lichfield.

R. Fol. Digital. purp. recent. ℥iv. coque ex
Aq. fontan. puræ ℔iss ad ℔i. et cola.
R. Decoct. Digital. ℥iss.
Aq. Nuc. Moschat. ʒii. M. fiat. haust. 2dis. horis sumend.

The patient took five of these draughts, which made her very sick, and acted very powerfully upon the kidneys, for within the first twenty-four hours she made upwards of eight quarts of water. The sense of fulness and oppression across her stomach was greatly diminished, her breath was eased, her pulse became more full and more regular, and the swellings of her legs subsided.

26th. Our patient being thus snatched from impending destruction, Dr. Darwin proposed to give her a decoction of pareira brava and guiacum shavings, with pills of myrrh and white vitriol; and, if costive, a pill with calomel and aloes. To these propositions I gave a ready assent.

30th. This day Dr. Darwin saw her, and directed a continuation of the medicines last prescribed.

August 1st. I found the patient perfectly free from every appearance of dropsy, her breath quite easy, her appetite much improved, but still very weak. Having some suspicion of a diseased liver, I directed pills of soap, rhubarb, tartar of vitriol, and calomel, to be taken twice a day, with a neutral saline draught.

9th. We visited our patient together, and repeated the draughts directed on the 26th of *June*, with the addition of tincture of bark, and also ordered pills of aloes, guiacum, and sal martis to be taken if costive.

September 10th. From this time the management of the case fell entirely under my direction, and perceiving symptoms of effusion going forwards, I desired that a solution of merc. subl. corr. might be given twice a day.

19th. The increase of the dropscial symptoms now made it necessary to repeat the Digitalis.

The dried leaves were used in infusion, and the water was presently evacuated, as before.

It is now almost nine years since the Digitalis was first prescribed for this lady, and notwithstanding I have tried every preventive method I could devise, the dropsy still continues to recur at times; but is never allowed to increase so as to cause much distress, for she occasionally takes the infusion and relieves herself whenever she chooses. Since the first exhibition of that medicine, very small doses have been always found sufficient to promote the flow of urine.

I have been more particular in the narrative of this case, partly because Dr. Darwin has related it rather imperfectly in the notes to his son's posthumous publication, trusting, I imagine, to memory, and partly because it was a case which gave rise to a very general use of the medicine in that part of Shropshire.

CASE V.—*December* 10th. Mr. L———, æt. 35. Ascites and anasarca, the consequence of very intemperate living. After trying squill and other medicines to no purpose, I directed a decoction of the Fol. Digital. recent. six drams to a pint; an eighth part to be taken every fourth hour. This made him sick, and produced a copious flow of urine, but not enough to remove all the dropsical symptoms. After a fortnight a stronger decoction was ordered, and, upon a third trial, as the winter advanced, it became necessary to use four ounces to the pint decoction; and thus he was freed from all his complaints.

In *October*, 1777, in consequence of having pursued his intemperate mode of living, his dropsy returned, accompanied by evident marks of diseased viscera. A decoction of two drams of Fol. Digital. siccat. to a pint, once more removed the dropsy. He took a wine-glass full thrice a day.

In *January*, 1778, I was desired to visit him again. I found he had gone on in his usual intemperate life, his countenance jaundiced, and the dropsy coming on apace. After giving some deobstruent medicines, I again directed the Digitalis, which again emptied the water; but he did not survive many weeks.

1777.

CASE VI.—*February* —. Mrs. M———, æt. 45. Ascites and anasarca, but not much otherwise diseased, and well enough to walk about the house, and see after her family affairs. I thought this a fair case for a trial of the Digitalis and therefore directed a decoction of the fresh leaves, the stock of dried ones being exhausted. About a week afterwards, calling to see my patient, I was informed that she was dead; that the third day after my first visit she suddenly fell down, and expired. Upon inquiry I found she had not taken any of the medicine; for the snow had lain so deep upon the ground, that the apothecary had not been able to procure it. Had the medicine been given in a case seemingly so favourably as this, and had the patient died under its use, is it not probable that the death would have been attributed to it?

CASE VII.—*February* 11th. Mr. E———, of W———, æt. 61. Hydrothorax, ascites, and anasarca, consequences of hard drinking. He had been attended for some time by a physician in his neighbourhood, who had treated his case with the usual remedies, but without affording him any relief; nor could I expect to succeed better by any other medicines than the Digitalis. The dried leaves were not to be had; and the green ones at this season being very uncertain in their strength, I ordered four ounces of the roots in a pint decoction, and directed three spoonfuls to be given every fourth hour, until it either excited nausea, or a free discharge of urine; both these effects took place nearly at the same time: he made a large quantity of water, the swellings subsided very considerably, and his breath became easy. Eight days afterwards he began upon a course of bitters and deobstruents. The dropsical symptoms soon increased again, but he had suffered so much from the severity of the sickness before, that he was neither willing to take, nor I to give the same medicine again.

Perhaps this patient might have been saved, if I had been well acquainted with the management and real doses of the medicine, which was certainly in this instance made very much too strong;

and notwithstanding the caution to stop the further exhibition when certain effects should take place, it seems the quantity previously swallowed was sufficient to distress him exceedingly.

Case VIII.—*March* 11th. Mrs. H———, æt. 32. A few days after a tedious labour her legs and thighs swelled to a very great degree; pale and semi-transparent,* with pain in both groins. After a purge of calomel and rhubarb, ung. merc. was ordered to be rubbed upon the groins, and the following decoction was directed:—

R. Fol. Digital, purp. recent. ℥ii.
Aq. puræ. ℔iss. coque ad ℔i. et colatur. adde.
Aq. cinn. sp. ℥iv. M. capiat. cyath. vinos. parv. bis quotidie.

The decoction presently increased the secretion of urine, and abated the distension of the legs: in a fortnight the swelling was gone; but some days after leaving her bed, her legs swelled again about the ancles, which was removed by another bottle of the decoction on the 21st of *April.*

Case IX.—*March* 29th. Mr. G———, æt. 47. Very much deformed; asthma of several years continuance, but now dropsical to a great degree. Took several medicines without relief, and then tried the Digitalis, but with no better success.

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* This disease has lately been well described by Mr. White, of Manchester.

Case X.—*April* 10th. G—— G————, æt. 70. Asthma and anasarca. Took a decoction of the fresh leaves of the Digitalis, which produced violent sickness, but no immediate evacuation of water. After the sickness had ceased altogether, the urine began to flow copiously, and he was cured.

Case XI.—*July* 10th. Mr. M——, of T——, æt. 54. A very hard drinker; had been affected since *November* last with ascites and anasarca, for which he had taken several medicines without benefit. A decoction of the recent leaves of the Digitalis was then directed, an ounce and a half to a pint, one-eighth of which I ordered to be given every fourth hour. A few doses brought on great nausea, indistinct vision, and a great flow of urine, so as presently to empty him of all the dropsical water. Indeed the evacuation was so rapid and so complete, that it became necessary to apply a bandage round the belly, and to support him with cordials.

In something more than a year and a half his dropsy returned, but the Digitalis did not then succeed to our wishes. In *August*, 1779, he was tapped, and lived afterwards only about five weeks.

For more particulars, see the extract of a letter from Mr. Lyon.

Case XII.—*September* 12th. Miss C————, of T————, æt. 48. An ovarium dropsy, and anasarcous legs and thighs. For three months in the beginning of this year she had been under the care of Dr. Darwin, who at different times had given her blue vitriol, elaterium, and calomel; decoction of pareira brava, and guiacum wood, with tincture of cantharides; oxymel of squills, decoction of parsley roots, &c. Finding no relief, she discontinued the use of medicines, until the urgency of her symptoms induced her to ask my advice about the end of *August*. She was greatly emaciated, and had almost a total loss of appetite. I first tried small doses of Merc. sublim. corr. in solution, with decoction of burdock roots, and blisters to the thighs. No advantage attending the use of this plan, I directed a decoction of Fol. Digit. a dram and a half to a pint; one ounce to be taken twice a day. It presently reduced the anasarcous swellings, but made no alteration in the distension of the abdomen.

CASE XIII.—*October* 9th. Mrs. B———, æt. 40. An ovarium dropsy. Took a decoction of Digitalis without effect. Her life was preserved for some years by repeated tapping.

1778.

CASE XIV.—*February* 8th. Mr. R———, of K———. Had formerly suffered much from gout, and lived very intemperately. Jaundiced countenance; ascites; legs and thighs greatly swollen; appetite none; extremely weak; confined to his bed. Had taken many medicines from his apothecary without advantage. I ordered him decoction of Digitalis, and a cordial; but he survived only a few days.

Case XV.—*March* 13th. Mr. M——, æt. 54. A thorax greatly deformed; asthma through the winter, succeeded by dropsy in belly and legs. Pulse very small; face leaden coloured; cough almost continual. Decoction of seneka was directed, and small doses of Dover's powder at night.

17th. Gum-ammoniac and squill, with elixir paregor. at night.—26th, Squill and decoction of seneka.—30th, His complaints still increasing, decoction of Digitalis was then directed, which relieved him in a few days; but his complaints returned again, and he died in the month of *June*.

Case XVI.—*August* 18th. Mr. B——, æt. 33. Pulmonary consumption and dropsy. The Digitalis, and that failing, other diuretics were used, in hopes of gaining some relief from the distress occasioned by the dropsical symptoms; but none of them were effectual. He was then attended by another physician, and died in about two months.

Case XVII.—*September* 21st. Mrs. M—— W—— G——, æt. 50. An ovarium dropsy. She took half a pint of Infus. Digitalis, which made her sick, but did not increase the quantity of urine. She was afterwards relieved by tapping.

Case XVIII.—*Oct*. 28th. R—— W——, æt. 33. Ascites and universal anasarca; countenance quite pale and bloated; appetite none, and the little food he forces down is generally rejected.

R. Fol. Digit. purp. siccat. ʒiii.
Aq. bull. ℔i. digere per horas duas, et colat. adde aq. junip. comp. ℥iii.

He was directed to take one ounce of this infusion every two hours until it should make him sick. This was on Wednesday. The fifth dose made him vomit. On Thursday afternoon he vomited again very freely, without having taken any more of the medicine. On Friday and Saturday he made more water than he had done for a week before, and the swellings of his face and body were considerably abated. He was directed to omit all medicine so long as the urine continued to flow freely, and also to keep an account of the quantity he made in twenty-four hours.

These were his reports:—

October	31st.	Saturday,	5	half pints.
November	1st.	Sunday,	6	,,
	2d.	Monday,	8	,,
	3d.	Tuesday,	8	,,
	4th.	Wednesday,	7	,,
	5th.	Thursday,	8	,,

On Wednesday he began to purge, and the purging still continues, but his appetite is better than he has known it for a long time. No swelling remains but about his ancles, extending at night half way up his legs.

Omit all medicines at present.

7th. Saturday,	7½	half pints.
8th. Sunday,	8	,,
9th. Monday,	6¾	,,
10th. Tuesday,	6½	,,
11th. Wednesday,	6	,,
12th. Thursday,	6¼	,,

On Tuesday the 17th, some swelling still reed about his ancles, but he was in every other respect perfectly well.

He took a few more doses of the infusion, and no other medicine.

CASE XIX.—*Dec.* 8th. W——— B———, æt. 60. A hard drinker. Diseased viscera, ascites, and anasarca. An infusion of Digitalis was directed, but it had no other effect than to make him sick.

1779.

In the beginning of this year we had many dropsies in children, who had suffered from the Scarlatina Anginosa; they all yielded very readily to the Digitalis, but in some the medicine purged, and then it did not prove diuretic, nor did it remove the dropsy until opium was joined with it, so as to prevent it purging. I did not keep notes of these cases, but I do not recollect a single instance in which the Digitalis failed to effect a cure.

Case XX.—*January* 1st. Mr. H———. Hydrops pectoris; legs and thighs prodigiously anasarcous; a very distressing sense of fulness and tightness across his stomach; urine in small quantity; pulse intermitting; breath very short.

He had taken various medicines, and been blistered, but without relief. His complaints continuing to increase, I directed an infusion of Digitalis, which made him very sick; acted powerfully as a diuretic, and removed all his symptoms.

About three months afterwards he was out upon a journey, and, after taking cold, was suddenly seized with difficulty of breathing, and violent palpitation of his heart: he sent for me, and I ordered the infusion as before, which very soon removed his complaints. He is now active and well; but, whenever he takes cold, finds some return of difficult breathing, which he soon removes by a dose or two of the infusion.

Case XXI.—*January* 5th. Mrs. M———, æt. 69. Hydrothorax (called asthma), ascites, and anasarca. I directed an infusion of Fol. Digital. siccat. three drams to a pint; a small wine glass to be taken every third or fourth hour. It made her violently sick, acted powerfully as a diuretic, perfectly relieved her breathing, and carried off the swelling of her legs; when she was nearly emptied, she became so languid, that I thought it necessary to order cordials, and a large blister to her back. Mr. Ward, who attended as her apothecary, tells me she had some return of her asthma in *June* and *October* following, which was each time removed by the same medicine.

Case XXII.—*January* 11th. Mr. H———, æt. 59. Ascites and general anasarca. A large corpulent man, and a hard drinker; he had repeatedly suffered under complaints of this kind, but had been always relieved by the judicious assistance of Dr. Ash. In the present instance, however, not finding relief as usual from the prescriptions of my worthy friend, he sent for me; after examining into his situation, and informing myself what had been done to relieve him, I was satisfied that the Digitalis was the only medicine from which I had any thing to hope. It was therefore directed; but another patient requiring my assistance at a distance from town, I desired he would not begin the medicine before I returned, which would be early on the third day; for I was well aware of the difficulties before me, and that he would inevitably sink under too rapid an evacuation of the water. On my return I was informed, that the preceding evening, as he sat on his chair, his head sunk upon his breast, and he died.

This case, as well as Case VI. is mentioned with a view to demonstrate to younger practitioners, how sudden and unexpected the deaths of dropsical patients sometimes happen, and how cautious we should be in assigning causes for effects.

Case XXIII.—*August* 31st. Mr. C———,

æt. 57. Diseased viscera, jaundice, ascites, and anasarca. After trying calomel, saline draughts, jalap purges, chrystals of tartar, pills of gum ammoniac, squill, and soap, sal succini, elaterium, &c. infusion of Digitalis was directed, which removed all his urgent symptoms, and he recovered a pretty good state of health.

Case XXIV.—*September* 11th. I was desired to visit Mr. L———, æt. 63; a middle sized man; rather thin; not habitually intemperate; found him in bed, where he had been for three days. He was in a state of furious insanity, and had been gradually losing his reason for ten days before, but was not outrageous the first week: his apothecary had given him ten grains of emetic tartar, a dram of ipecacuanha, and an ounce of tincture of jalap, in the space of a few hours, which scarcely made him sick, and only occasioned a stool or two; upon inquiring into the usual state of his health, I was told that he had been troubled with some difficulty of breathing for thirty years past, but for the nine last years this complaint had increased, so that he was often obliged to sit up the greater part of the night; and, for the last year, the sense of suffocation was so great, when he lay down, that he often sat up for a week together. His father died of an asthma before he was fifty. A few years ago, at an election, where he drank more than usual, his head was affected as now, but in a slighter degree, and his asthmatic symptoms vanished; and now, notwithstanding he has been several days in bed, he feels not the least difficulty in breathing.

Apprehending that the insanity might be owing to the same cause which had heretofore occasioned the asthma, and that this cause was water; I ordered a decoction of the Fol. siccat Digital. three drams to half a pint; three spoonfuls to be taken every third hour: the fourth dose made him sick; the medicine was then stopped; the sickness continued at intervals, more or less, for four days, during which time he made a great quantity of water, and gradually became more rational. On the fifth day his appetite began to return, and the sickness ceased, but the flow of urine still continued.

A week afterwards I saw him again, and examined him particularly; he was then perfectly rational, appetite very good, breath quite easy, permitting him to lie down in bed without inconvenience, makes plenty of water, coughs a little, and expectorates freely. He took no other medicine, except a little rhubarb when costive.

CASE XXV.—*Sept.* 15th. Mr. J. R———, æt. 50. Subject to an asthmatical complaint for more than twenty years, but was this year much worse than usual, and symptoms of dropsy appeared. In *July* he took G. ammon. squill and seneka, with infus. amarum and fossil alkali. In *August*, infusum amar. with vin. chalyb. and at bed-time pil. styr. and squill. His complaints increasing, the squill was pushed as far as could be borne, but without any good effect. *September* 15th an infusion of Digitalis was directed, but he died the next morning.

CASE XXVI.—*Sept.* 18th. Mrs. R——, æt. 30. After a severe child-bearing, found both her legs and thighs swelled to the utmost stretch of the skin. They looked pale, and almost transparent. The case being similar to that related at No. VIII. I determined upon a similar method of treatment; but as this patient had an inflammatory sore throat also, I wished to get that removed first, and in three or four days it was done. I then directed an infusion of Digitalis, which soon increased the urinary secretion, and reduced the swellings, without any disturbance of her stomach.

A few days after quitting her bed and coming down stairs, some degree of swelling in her legs returned, which was removed by calomel, an opening electuary, and the application of rollers.

CASE XXVII.—*October* 7th. Mr. F——, a little man, with a spine and thorax greatly deformed, for more than a year past had complained of difficult respiration, and a sense of fulness about his stomach; these complaints increasing, his abdomen gradually enlarged, and a fluctuation in it became perceptible. He had no anasarca, no appearance of diseased viscera, and no great paucity of urine. Purges and diuretics of different kinds affording him no relief, my assistance was desired. After trying squill medicines without effect, he was ordered to take Pulv.

Fol. Digital. in small doses. These producing no sensible effect, the doses were gradually increased until nausea was excited; but there was no alteration in the quantity of urine, and consequently no relief to his complaints. I then advised tapping, but he would not hear of it; however, the distress occasioned by the increasing fulness of his belly at length compelled him to submit to the operation on the 20th of *November*. It was necessary to draw off the water again upon the following days:—

December the 8th.
— 27th.
1780. *February* the 4th.
— 23d.
March the 9th.

During the intervals, no method I could think of was omitted to prevent the return of the disease, but nothing seemed to avail. In the operation of *February* 23d, his strength was so much reduced, that the water was not entirely removed; and on the 9th of *March*, before his belly was half emptied, notwithstanding the most judicious application of bandage, his debility was so great, that it was judged prudent to stop. After being placed in bed, the faintness and sickness continued; severe rigors ensued, and violent vomiting; these vomitings continued through the night, and in the intervals he lay in a state nearly approaching to syncope. The next day I found him with nearly the same symptoms, but remarked that the quantity of fluid he had thrown up was very much more than what he had taken, and that his abdomen was considerably fallen; in the course of two or thee days more, he discharged the whole of the effused fluid; his strength and appetite gradually returned, and he was in all respects much better than he had been before the last operation.

Some time afterwards, his belly began to fill again, and he again applied to me: upon an accurate examination, I judged the quantity of fluid might then be about four or five quarts. Nature had pointed out the true method of cure in this case; I therefore ordered him to bed, and directed ipecacuanha vomits to be given night and morning: in two or three days the whole of the water was removed by vomiting, for he never purged, nor was the quantity of his urine increased; his appetite and strength gradually returned; he never had any further relapse, and is now an active healthy man. I must leave the reader to make his own reflections on this singular case.

1780.

Case XXVIII.—*Jan.* 11th. Capt. V———, æt. 42, had suffered much from residing in hot climates, and drinking very freely, particularly rum in large quantities. He had tried many physicians before I saw him, but nothing relieved him. I found him greatly emaciated; his countenance of a brownish yellow; no appetite, extremely low, distressing fulness across his stomach; legs and thighs greatly swoln; pulse quick and very feeble; urine in small quantity. As he had evidently only a few days to live, I ordered him nothing but a solution of sal diureticus in cinnamon water, slightly acidulated with syrup of lemons. This medicine effecting no change, and his symptoms becoming daily more distressing, I directed an infusion of Digitalis. A few doses occasioned a copious flow of urine, without sickness or any other disturbance. The medicine was discontinued; and the next day the urine continuing to be secreted very plentifully, he lost his most distressing complaints, was in great spirits, and ate a pretty good dinner. In the evening, as he was conversing cheerfully with some friends, he stooped forwards, fell from his chair, and died instantly. Had he been in bed, I think there is reason to believe this fatal syncope, if such it was, would not have happened.

CASE XXIX.—*February* 6th. Mr. H———, æt. 63. A corpulent man; had suffered much from gout, which, for the last year or two, had formed very imperfectly. He had now symptoms of water in his chest, his belly, and his legs. An infusion of Digitalis removed these complaints, and after having been confined for the greater part of the winter, he was well enough to get abroad again. In the course of a month, the dropsical symptoms returned, and were again removed by the same medicine. Bitters and tonics were now occasionally prescribed, but his debility gradually increased, and he died some time afterwards;—but the dropsy never returned.

Case XXX.—*February* 17th. Mr. D———, æt. 50. Ascites and anasarca, with symptoms of phthisis. He had been a very hard drinker. The infusum Digitalis removed his dropsical symptoms, and he was sufficiently recovered to take a journey; but, as the spring advanced, the consumptive symptoms increased, and he died soon afterwards perfectly emaciated.

Case XXXI.—*March* 5th. I was desired to visit Mrs. H———, a very delicate woman, who, after a severe lying-in, had her legs and thighs swoln to a very great degree, pale, and semi-transparent. I found her extremely faint; her pulse very small and slow; vomiting violently, and frequently purging. She was attended by a gentleman who had seen me give the Digitalis in a similar case of swelled legs after a lying-in (see Case XXVI.) about six months before. He had not considered that this patient was delicate—the other robust; nor had he attended to stop the exhibition of the medicine when its effects began to take place. The great distress of her situation was evidently owing to the imprudent and unlimited use of the Digitalis. I was very apprehensive for her safety; ordered her cordials and volatiles; a free supply of wine; chamomile tea with brandy for common drink, and blisters. The next day her situation was much the same; but, with all this disturbance, no increased secretion of urine. The same methods were continued; an opiate ordered at night, and liniment. volatile upon flannel applied to the groins, as she now complained of great pain in those parts. The third day the nausea was less urgent, the vomitings less frequent, the pulse not so slow. Camphorated spirit, with caustic volatile alkali, was applied to the stomach, emulsion given for common drink, and the same medicines repeated. From this time, the intervals became gradually longer between the fits of vomiting; the flow of urine increased; the swellings subsided; the appetite returned, and she recovered perfectly.

CASE XXXII.—*March* 16th. Mr. D———, æt. 70. A paralytic attack had, for some weeks past, impaired the use of his left side, and he complained much of his breath, and of a straightness across his stomach. At length, an anasarca and ascites appearing, I had no doubt as to the cause of the former symptoms; but, upon account of his advanced age and the paralytic affection, I hesitated to give the Digitalis, and therefore tried the other usual modes of practice, until at length his breath would not permit him to lie down in bed, and his other symptoms increased so rapidly as to threaten a speedy dissolution. In this dilemma, I ventured to prescribe an infusion of the Fol. siccat. Digital. which presently excited a copious flow of urine, and made him very sick: a strong infusion of chamomile flowers with brandy relieved the sickness, but the diuretic effects of the Digitalis continuing, his dropsy was removed, and his breathing became easy. The palsy remained nearly in the same state. He lived until *August*, 1782, and without any return of the dropsy.

CASE XXXIII.—*March* 18th. Miss S———, æt. 5. Hydrocephalus internus. As the case did not yield to calomel, when matters were nearly advanced to an extremity, it occurred to me to try the Infusum Digitalis; a few doses of which were given, but had no sensible effect.

CASE XXXIV.—*March* 19th. A young lady, soon after the birth of an illegitimate child, became insane. After being nearly a month under my care, swellings of her legs, which at first had been attributed to weakness, extended to her thighs and belly; her urine became foul and small in quantity, and the insanity remained nearly the same. As it had been very difficult to procure evacuations by any means, I ordered half an ounce of Fol. Digital. siccat. in a pint infusion, and directed two spoonfuls to be given every two hours; this had the desired effect: the dropsy and the insanity disappeared together, and she had afterwards no other medicine but some aperient pills to take occasionally.

CASE XXXV.—*April* 12th. Mr. R———, æt. 32, for the last three or four years had had more or less of what was considered as asthma: —it appeared to me to be Hydrothorax. I directed an infusion of Digitalis, which presently removed his complaints. In *June* following he had a relapse, and took two grains of the Pulv. Fol. Digit. three times a day, which cured him after taking forty grains, and he has never had a return.

Case XXXVI.—*May* 15. Mrs. H———, æt. 40. A spasmodic asthma attended with symptoms of effusion. An infusion of Digitalis relieved her very considerably, and she lived four years afterwards without any relapse.

Case XXXVII.—*May* 26th. R—— B———, æt. 12. Scrophulous, consumptive, and at length anasarcous. Took Infus. Digital. without advantage. Died the *July* following.

Case XXXVIII. *June* 4th. Mrs. S———, of W———, æt. 49. Ascites and anasarca. Had taken many medicines;—first from her apothecary, afterwards by the direction of a judicious and celebrated physician; but nothing retarded the increase of the dropys. I first saw her along with the physician mentioned above, on the 14th of *May;* we directed an electuary of chrystals of tartar and Seltzer water for common drink; this plan failing, as others had done before, we ordered the Infus. Digital. which, in a few days, nearly removed the dropsy. I then left her to the care of the physician; but her constitution was too much impaired to admit of restoration to health, and I understand she died a few weeks afterwards.

Case XXXIX.—*June* 13th. Mr. P———,

æt. 35, a very hard drinker, was attacked with a severe hæmoptoe, which was followed by ascites and anasarca. He had every appearance of diseased viscera, and his urine was small in quantity. The powder and the infusion of Digitalis were given at different times, but without the desired effect. Other medicines were tried, but in vain. Tapping prolonged his existence a few weeks, and he died early in the following autumn.

CASE XL.—*June* 27th. Mr. W———, æt. 37. An apparently asthmatic affection, gradually increasing for three or four years, which not yielding to the usual remedies, he took the infusion of Digitalis. Two or three doses made him very sick, but he thought his breathing relieved. After one week he took it again, and was so much better as to need no other medicine.

In the course of the following winter he became hectic, and died consumptive about a year afterwards.

CASE XLI.—*July* 6th.—Mr. E———, æt. 57. Hydrothorax and anasarca. His breath so short that he could not lie down. After a trial of squill, fixed alkali, and dulcified spirit of nitre, I directed Pulv. Digital. gr. 2, thrice a day. In four days he was able to come down stairs; in three days more no appearance of disease remained; and under the use of aromatics and small doses of opium, he soon recovered his strength.

Case XLII.—*July* 7th. Miss H——, of T——, æt. 39. In the last stage of phthisis pulmonalis became dropsical. She took the Digitalis without being relieved.

Case XLIII.—*July* 9th. Mrs. F——, æt. 70. A cheerful, strong, healthy woman; but for a few years back had experienced a degree of difficult breathing when in exercise. In the course of the last year her legs swelled, and she felt great fulness about her stomach. These symptoms continued increasing very fast, notwithstanding several attempts made by a judicious apothecary to relieve her. The more regular practitioner failing, she had recourse to a quack, who, I believe, plied her very powerfully with Daphne laureola, or some drastic purge of that kind. I found her greatly reduced in strength, her belly and lower extremities swollen to an amazing size, her urine small in quantity, and her appetite greatly impaired. For the first fortnight of my attendance, blisters were applied, solution of fixed alkali, decoction of seneka with vitriolic æther, chrystals of tartar, squill and cordial medicines were successively exhibited, but with no advantage. I then directed Pulv. Fol. Digital. two grains every four hours. After taking eighteen grains, the urine began to increase. The medicine was then stopped. The discharge of urine continued to increase, and in five or six days the whole of the dropsical water passed off, without any disturbance to the stomach or bowels. As the distention of the belly had been very great, a swathe was applied, and drawn gradually tighter as the water was evacuated. As no pains were spared to prevent the return of the dropsy, and as the best means I could devise proved unequal to my wishes, both in this and in some other cases, I shall take the liberty to point out the methods I tried at different times in as concise a manner as possible, for the knowledge of what will not do, may sometimes assist us to discover what will.

1780.

July 18th. Infusum amarum, steel, Seltzer water.

September 22d. Neutral saline draughts, with tinct. canthar.

26th. Pills of soap, garlic, and millepedes.

30th. The same pills, with infusum amarum.

October 11th. Pills of aloes, asafœtida, and sal martis, in the day-time, and mercury rubbed down, at night.

December 21st. The accumulation of water now required a repetition of the Digitalis. It was directed in infusion, a dram and half to eight ounces, and an ounce and half given every fourth hour, until its effects began to appear. The water was soon carried off.

30th. Sal diuretic. twice a day. To eat preserved garlic frequently.

1781.

February 1st. Pills of calomel, squill, and gum ammoniac.

3d. Infusion of Digitalis repeated, and, after the water was carried off, Dover's powder was tried as a sudorific.

March 18th. Infus. Digital. repeated.

26th. Pills of sal martis and aromatic species, with infusum amarum.

May 5th. Being feverish, James's power and saline draughts.

10th. Laudanum every night, and an opening tincture to obviate costiveness.

24th. Infus. Digitalis, one ounce only every fourth hour, which soon procured a perfect evacuation of the water.

August 11th. Infus. Digitalis.

October 19th. An emetic, and fol. Cicut. pulv. ten grains every six hours.

November 8th. A mercurial bolus at bed-time.

16th. Infus. Digitalis.

December 23d. An emetic—Pills of seneka and gum ammoniac—Vitriolic acid in every thing she drinks.

25th. Squill united to small doses of opium.

1782.

January 2d. A troublesome cough—Syrup of garlic and oxymel of squills. A blister to the back.

4th. Tincture of cantharides and paregoric elixir.

28th. Infus. Digitalis, half an ounce every morning, and one ounce every night, was now sufficient to evacuate the water.

March 26th. Infus. Digiatils; and after evacuation, vitriol of copper twice a day.

April 1st. A cordial mixture for occasional use. Two months afterwards a purging came on, which every now and then returned, inducing great weakness—her appetite failed, and she died in *July*.

INTERVALS.

From *July* 9th, 1780, to *December* 21st, 171 days.
From *December* 21st to *February* 3d, 1781, 34 days.
From *February* 3d to *March* 18th, 44 days.
From *March* 18th to *May* 24th, 66 days.
From *May* 24th to *August* 11th, 79 days.
From *August* 11th to *November* 16th, 98 days.
From *November* 16th to *January* 28th, 1782, 74 days.
From *January* 28th to *March* 26th, 57 days.

None of the accumulations of water were at all equal to that which existed when I first saw her, for, finding so easy a mode of relief, she became impatient under a small degree of pressure, and often insisted upon taking her medicine sooner than I thought it necessary. After the 26th of *March* the degree of effusion was inconsiderable, and at the time of her death very trifling, being probably carried off by the diarrhœa.

CASE XLIV.—*July* 12th. Mr. H———, of A———, æt. 60. In the last stage of a life hurried to a termination by free living, dropsical symptoms became the most distressing. He wished to take the Digitalis. It was given, but afforded no relief.

Case XLV.—*July* 13th. Mr. S———, æt. 49. Asthma, or rather hydrothorax, anasarca, and symptoms of a diseased liver. He was directed to take two grains of Pulv. Fol. Digital. every two hours, until it produced some effect. It soon removed the dropsical and asthmatic affections, and steel, with Seltzer water, restored him to health.

Case XLVI.—*August* 6th. Mr. L———, æt. 35. Ascites and anasarca. Pulv. Digital. grains three, repeated every fourth hour, until he had taken two scruples, removed every appearance of dropsy in a few days. He was then directed to take solution of merc. sublimat. and soon recovered his health and strength.

Case XLVII.—*August* 16th. Mr. G———, of W———, æt. 86. Asthma of many years duration, and lately an incipient anasarca, with a paucity of urine. He had never lived intemperately, was of a cheerful disposition, and very sensible: for some years back had lost all relish for animal food, and his only support had been an ounce or two of bread and cheese, or a small slice of seed-cake, with three or four pints of mild ale, in the twenty-four hours. After trying chrystals of tartar, fixed alkali, squills, &c. I directed three grains of Pulv. Fol. Digital. made into pills, with G. ammoniac, to be given every six hours; this presently occasioned copious discharges of urine, removed his swellings, and restored him to his usual standard of health.

Case XLVIII.—*Aug*. 17th. T——— B———,

Esq. of K——, æt. 46. Jaundice, dropsy, and great hardness in the region of the liver. Infusion of Digitalis carried off all the effusion, and afterwards a course of deobstruent and tonic medicines removed his other complaints.

Case XLIX.—*August* 23d. Mr. C——, æt. 58. (The person mentioned at Case XXIII.) He had continued free from dropsy until within the last six weeks; his appetite was now totally gone, his strength extremely reduced, and the yellow of his jaundice changed to a blackish hue. The Digitalis was now tried in vain, and he died shortly afterwards.

Case L.—*August* 24th. Mrs. W——, æt. 39. Anasarcous legs and symptoms of hydrothorax, consequent to a tertian ague. Three grains of Pulv. Digitalis, given every fourth hour, occasioned a very copious flow of urine, and she got well without any other medicine.

Case LI.—*Aug*. 28th. Mr. J—— H——, æt. 27. In consequence of very free living, had an ascites and swelled legs. I ordered him to take two grains of Fol. Digital. Pulv. every two hours, until it produced some effect; a few doses caused a plentiful secretion of urine, but no sickness, or purging: in six days the swellings disappeared, and he has since remained in good health.

Case LII.—*September* 27th. Mr. S——, æt. 45. Had been long in an ill state of health, from what had been supposed an irregular gout, was greatly emaciated, had a sallow complexion, no appetite, costive bowels, quick and feeble pulse. The cause of his complaints was involved in obscurity; but I suspected the poison of lead, and was strengthened in this suspicion, upon finding his wife had likewise ill health, and, at times, severe attacks of colic; but the answers to my inquiries seemed to prove my suspicions groundless, and, amongst other things, I was told the pump was of wood. He had lately suffered extremely from difficult breathing, which I thought owing to anasarcous lungs; there was also a slight degree of pale swelling in his legs. Pulv. Fol. Digital. made into pills, with gum ammoniac and aromatic species, soon relieved his breathing. Attempts were then made to assist him in other respects, but with little good effect, and some months afterwards he died, with every appearance of a worn out constitution.

About two years after this gentleman's death, I was talking to a pump-maker, who, in the course of conversation, mentioned the corrosion of leaden pumps, by some of the water in this town, and instanced that at the house of Mr. S———, which he had replaced with a wooden one about three years before. The lead, he said, was eaten away, so as to be very thin in some places, and full of holes in others;—this accidental information explained the mystery.

The deleterious effects of lead seem to be considerably modified by the constitution of the patient; for in some families only one or two individuals shall suffer from it, whilst the rest receive it with impunity. In the spring of the year 1776, I was desired to visit Mrs. H———, of S——— Park, who had repeatedly been attacked with painful colics, and had suffered much from insuperable costiveness; I suspected lead to be the cause of her complaints, but was unable to trace by what means it was taken. She was relieved by the usual methods; but, a few months afterwards, I was desired to see her again: her sufferings were the same as before, and notwithstanding every precaution to guard against costiveness, she was never in perfect health, and seldom escaped severe attacks twice or thrice in a year; she had also frequent pains in her joints. I could not find any traces of similar complaints either in Mr. H———, the children, or the servants. Mrs. H——— was a water drinker, and seldom tasted any fermented liquor. The pump was of wood, as I had been informed upon my first visit. Her health continued nearly in the same state for two or three years more, but she always found herself better if she left her own house for any length of time. At length it occurred to me, that though the pump was a wooden one, the piston might work in lead. I therefore ordered the pump rods to be drawn up, and upon examination with a magnifying glass, found the leather of the piston covered with an infinite number of very minute shining particles of lead. Perhaps in this instance the metal was so minutely divided by abrasion, as to be mechanically suspended in the water. The lady was directed to drink the water of a spring, and never to swallow that from the pump. The event confirmed my suspicions, for she gradually recovered a good state of health, lost the obstinate costiveness, and has never to this day had any attack of the colic.

Case LIII.—*September* 28th. Mrs. J——, æt. 70. Ascites and very thick anasarcous legs and thighs, total loss of strength and appetite. Infusion of Digitalis was given, but, as had been prognosticated, with no good effect.

Case LIV.—*September* 30th. Mr. A——, æt. 57. A strong man; hydrothorax and swollen legs; in other respects not unhealthy. He was directed to take two grains of the Pulv. Fol. Digit. made into a pill with gum ammoniac. Forty grains thus taken at intervals, effected a cure by increasing the quantity of urine, and he has had no relapse.

Case LV.—*November* 2d. Mr. P——, of T——, æt. 42. A very strong man, drank a great quantity of strong ale, and was much exposed to alterations of heat and cold. About the end of summer found himself short breathed, and lost his appetite. The dyspnœa gradually increased, he had a most distressing sense of tightness across his stomach, his urine was small in quantity, and high coloured, and his legs began to swell; his pulse slender and feeble. From the 20th of *September* I frequently saw him, and observed a gradual and regular increase of all his complaints, notwithstanding the use of the most powerful medicines I could prescribe. He took chrystals of tartar, seneka, gum ammoniac, saline draughts, emetics, tinct. of cantharides, spirits of nitre dulcified, squills in all forms, volatile alkali, calomel, Dover's powder, &c. Blisters and drastic purgatives were tried, interposing salt of steel and gentian. I had all along felt a reluctance to prescribe the Digitalis in this case, from a persuasion that it would not succeed. At length I was compelled to it, and directed one grain to be given every two hours until it should excite nausea. This it did; but, as I expected, it did no more. The reason of this opinion will be mentioned hereafter. Five days after this last trial I gave him asafœtida in large quantity, flattered by a hope that his extreme sufferings, from the state of his respiration, might perhaps arise in part from spasm, but my hopes were vain. I now thought of using an infusion of tobacco, and prescribed the following:

R. Fol. Nicotian. incis. ʒii.
Aq. bull. ℔ss.
Sp. Vini rectif. ℥i digere per horam.

I directed a spoonful of this to be given every two hours until it should vomit. This medicine had no better effect than the former ones, and he died some days afterwards.

Case LVI.—*November* 6th. Mr. H——, æt. 47. In the last stage of a phthisis pulmonalis, suffered much from dyspnœa, and anasarca.

Squill medicines gave no relief. Digitalis in pills, with gum ammon. purged him, but opium being added, that effect ceased, and he continued to be relieved by them as long as he lived.

Case LVII.—*November* 16th. Mrs. F———, æt. 53. In *August* last was suddenly seized with epileptic fits, which continued to recur at uncertain intervals. Her belly had long been larger than natural, but without any perceptible fluctuation. Her legs and thighs swelled very considerably the beginning of this month, and now there was evidently water in the abdomen. The medicines hitherto in vain directed against the epileptic attacks, were now suspended, and two grains of the Pulv. Fol. Digital. directed to be taken every six hours. The effects were most favourable, and the dropsical symptoms were soon removed by copious urinary discharges.

The attacks of epilepsy ceased soon afterwards. In *February*, 1781, there was some return of the swellings, which were soon removed, and she now enjoys very good health. Does not the narrative of this case throw light upon the nature of the epilepsy which sometimes attacks women, soon after the cessation of the catamenia?

1781.

Case LVIII.—*January* 1st. Mrs. G———, of H———, æt. 62. Ascites and very large hard legs. After trying various medicines, under the direction of a very able physician, I ordered her to take one grain of Pulv. Digital. every six hours, but it produced no effect. Other medicines were then tried to as little purpose. About the end of *February*, I directed an infusion of the Fol. Digital. but with no better success. Other methods were thought of, but none proved efficacious, and she died a few weeks afterwards.

CASE LIX.—*January* 3d. Mrs. B——, æt. 53. Ascites, anasarca, and jaundice. After a purge of calomel and jalap, was ordered the infusion of Digitalis: it acted well as a diuretic, and greatly reduced her swellings. Other medicines were then administered, with a view to her other complaints, but to no purpose, and she died about a month afterwards.

CASE LX.—*January* 14th. Mr. B——, of D——. Jaundice and ascites, the consequences of great intemperance. Extremely emaciated; his tongue and fauces covered with apthous crusts, and his appetite gone. He first took tincture of cantharides with infusum amarum, then vitriolic salts, and various other medicines without relief; infusum Digitalis was given afterwards, but was equally unsuccessful.

CASE LXI.—*February* 2d. I was desired by the late learned and ingenious Dr. Groome, to visit Miss S——, a young lady in the last state of emaciation from dropsy. Every probable mean to relieve her had been used by Dr. Groome, but to no purpose; and she had undergone the operation of the paracentesis repeatedly. The Doctor knew, he said, that I had cured many cases of dropsy, by the Digitalis, after other more usual methods had been attempted without success, and he wished this lady to try that medicine under my direction. After examining the patient, and inquiring into the history of the disease, I was satisfied that the dropsy was encysted, and that no medicine could avail. The Digitalis, however, was directed, and she took it, but without advantage. She had determined not to be tapped again, and neither persuasion, nor distress from the distension, could prevail upon her: I at length proposed to make an opening into the sac, by means of a caustic, which was done under the judicious management of Mr. Wainwright, surgeon, of Dudley. The water was evacuated without any accident, and the patient afterwards relieved herself from time to time as the pressure of it became troublesome, until she died at length perfectly exhausted.

Query. Is there not a probability that this method, assisted by bandage, might be used so as to effect a cure, in the earlier stages of ovarium dropsy?

CASE LXII.—*February* 27th. Mrs. O———, of T———, æt. 52, with a constitution worn out by various complicated disorders, at length became dropsical. The Digitalis was given in small doses, in hopes of temporary benefit, and it did not fail to fulfil our expectations.

CASE LXIII.—*March* 16th. Mrs. P———, æt. 47. Great debility, pale countenance, loss of appetite, legs swollen, urine in small quantity. A dram of Fol. siccat. Digital. in a half-pint infusion was ordered, and an ounce of this infusion directed to be taken every morning. Myrrh and steel were given at intervals. Her urine soon increased, and the symptoms of dropsy disappeared.

Case LXIV.—*March* 18th. Mr. W———, in the last stage of a pulmonary consumption, became dropsical. The Digitalis was given, but without any good effect.

Case LXV.—*April* 6th. Mr. B———, æt. 63, for some years had complained of being asthmatical, and was not without suspicion of diseased viscera. The last winter he had been mostly confined to his house; became dropsical, lost his appetite, and his skin and eyes turned yellow. By the use of medicines of the deobstruent class he became less discoloured, and the hardness about his stomach seemed to yield; but the ascites and anasarcous symptoms increased so as to oppress his breathing exceedingly. Alkaline salts, and other diuretics, failing of their effects, I ordered him to take an infus. of Digitalis. It operated so powerfully that it became necessary to support him with cordials and blisters, but it freed him from the dropsy, and his breath became quite easy. He then took soap, rhubarb, tartar of vitriol, and steel, and gradually attained a good state of health, which he still continues to enjoy.

Case LXVI.—*April* 8th. Mr. B———, æt 60. A corpulent man, with a stone in his bladder, from which at times his sufferings are extreme.

He had been affected with what was supposed to be an asthma for several years, by fits, but through the last winter his breath had been much worse than usual; universal anasarca supervened, and soon afterwards an ascites. Now his urine was small in quantity and much saturated, the dysuria was more dreadful than ever; his breath would not allow him to lie in bed, nor would the dysuria permit him to sleep; in this distressful situation, after having used other medicines to little purpose, I directed an infusion of Digitalis to be given. When the quantity of urine became more plentiful, the pain from his stone grew easier; in a few days the dropsy and asthma disappeared, and he soon regained his usual strength and health. Every year since, there has been a tendency to a return of these complaints, but he has recourse to the infusion, and it immediately removes them.

CASE LXVII.—*April* 24th. Mr. M———, of C———, æt. 57. Asthma, anasarca, jaundice, and great hardness and straightness across the region of the stomach. After a free exhibition of neutral draughts, alkaline salt, &c. the dropsy and difficult breathing remaining the same, he took Infusum Digitalis, which removed those complaints. He never lost the hardness about his stomach, but enjoyed very tolerable health for three years afterwards, without any return of the dropsy.

CASE LXVIII.—*April* 25th. Mrs. J———, æt. 42. Phthisis pulmonalis and anasarcous legs and thighs. She took the Infusum Digitalis without effect. Myrrh and steel, with fixed alkali, were then ordered, but to no purpose.

Case LXIX.—*May* 1st. Master W———, of St———, æt. 6. I found him with every symptom of hydrocephalus internus. As it was yet early in the disease, in consequence of ideas which will be mentioned hereafter, I directed six ounces of blood to be immediately taken from the arm; the temporal artery to be opened the succeeding day; the head to be shaven, and six pints of cold water to be poured upon it every fourth hour, and two scruples of strong mercurial ointment to be rubbed into the legs every day. Five days afterwards, finding the febrile symptoms very much abated, and judging the remaining disease to be the effect of effusion, I directed a scruple of Fol. Digital. siccat. to be infused in three ounces of water, and a table-spoonful of the infusion to be given every third or fourth hour, until its action should be someway sensible. The effect was an increased secretion of urine; and the patient soon recovered.

Case LXX.—*May* 3d. Mrs. B———, æt. 59. Ascites and anasarca, with strong symptoms of diseased viscera. Infusum Digitalis was at first prescribed, and presently removed the dropsy. She then took saline draughts and calomel. After some time she became feverish: the fever proved intermittent, and was cured by the bark.

Case LXXI.—*May* 3d. Mr. S———, æt. 48.

A strong man, who had lived intemperately. For some time past his breath had been very short, his legs swollen towards evening, and his urine small in quantity. Eight ounces of the Infus. Digitalis caused a considerable flow of urine; his complaints gradually vanished, and did not return.

Case LXXII.—*May* 24th. Joseph B———, æt. 50. Ascites, anasarca, and jaundice, from intemperate living. Infusion of Digitalis produced nausea, and lowered the frequency of the pulse; but had no other sensible effects. His disorder continued to increase, and proved fatal about two months afterwards.

Case LXXIII.—*June* 29th. Mr. B———, æt. 60. A hard drinker; afflicted with asthma, jaundice, and dropsy. His appetite gone; his water foul and in small quantity. Neutral saline mixture, chrystals of tartar, vinum chalybeat. and other medicines had been prescribed to little advantage. Infusion of Fol. Digitalis acted powerfully as a diuretic, and removed the most urgent of his complaints, viz. the dropsical and asthmatical symptoms.

The following winter his breathing grew bad again, his appetite totally failed, and he died, but without any return of the ascites.

Case LXXIV.—*June* 29th. Mr. A———, æt. 58. Kept a public house and drank very hard. He had symptoms of diseased viscera, jaundice, ascites, and anasarca. After taking various deobstruents and diuretics, to no purpose, he was ordered the Infusion of Digitalis: a few doses occasioned a plentiful flow of urine, relieved his breath, and reduced his swellings; but, on account of his great weakness, it was judged imprudent to urge the medicine to the entire evacuation of the water. He was so much relieved as to be able to come down stairs and to walk about, but his want of appetite and jaundice continuing, and his debility increasing, he died in about two months.

CASE LXXV.—*July* 18th. Mrs. B———, æt. 46. A little woman and very much deformed. Asthmatical for many years. For several months past had been worse than usual; appetite totally gone, legs swollen, sense of great fulness about her stomach, countenance fallen, lips livid, could not lie down.

The usual modes of practice failing, the Digitalis was tried, but with no better success, and in about a month she died; not without suspicion of her death having been accelerated a few days, by her taking half a grain of opium. This may be a caution to young practitioners to be careful how they venture upon even small doses of opium in such constitutions, however much they may be urged by the patient to prescribe something that may procure a little rest and ease.

CASE LXXVI.—*August* 12th. Mr. L———, æt. 65, the person whose case is recorded at No. XXIV. had a return of his insanity, after nearly two years of perfect health. He was extremely reduced when I saw him, and the medicine which cured him before was now administered without effect, for his weakness was such that I did not dare to urge it.

Case LXXVII.—*Sept.* 10th. Mr. V———, of S———, æt. 47. A man of strong fibre, and with the remains of a florid complexion. His disease an ascites and swelled legs, the consequence of a very free course of life; he had been once tapped, and taken much medicine before I saw him. The Digitalis was now directed: it lowered his pulse, but did not prove diuretic. He returned home, and soon after was tapped again, but survived the operation only a few hours.

Case LXXVIII.—*Sept.* 25th. Mr. O———, of M———, æt. 63. Very painful and general swellings in all his limbs, which had confined him mostly to his bed since the preceding winter; the swellings were uniform, tense, and resisting, but the skin not discoloured. After trying guiacum and Dover's powder without advantage, I directed Infusion of Digitalis. It acted on the kidneys, but did not relieve him. It is not easy to say what the disease was, and the patient living at a distance, I never learnt the future progress or termination of it.

Case LXXIX.—*Sept.* 26th. Mr. D———, æt. 42, a very sensible and judicious surgeon at B———, in Staffordshire, laboured under ascites and very large anasarcous legs, together with indubitable symptoms of diseased viscera. Having tried the usual diuretics to no purpose, I directed a scruple of Fol. Digital. siccat. in a four-ounce infusion, a table spoonful to be taken twice a day. The second bottle wholly removed his dropsy, which never returned.

Case LXXX.—*Sept.* 27th. Mrs. E———, æt. 42. A fat sedentary woman; after a long illness, very indistinctly marked, had symptoms of enlarged liver and dropsy. In this case I was happy in the assistance of Dr. Ash. Digitalis was once exhibited in small doses, but to no better purpose than many other medicines. She suffered great pain in the abdomen for several weeks, and, after her death, the liver, spleen, and kidneys, were found of a pale colour, and very greatly enlarged, but the quantity of effused fluid in the cavity was not more than a pint.

Case LXXXI.—*October* 28th. Mr. B———, æt. 33. Had drank an immense quantity of mild ale, and was now become dropsical. He was a lusty man, of a pale complexion; his belly large, and his legs and thighs swollen to an enormous size. I directed the Infusion of Digitalis, which in ten days completely relieved him. He was then put upon the use of steel and bitters, and directed to live temperately, which I believe he did, for I saw him two years afterwards in perfect health.

Case LXXXII.—*Nov.* 14th. Mr. W———, of T———, æt. 49. A lusty man, with an asthma and anasarca. He had taken several medicines by the direction of a very judicious apothecary, but not getting relief as he had been accustomed to do in former years, he came under my care. For the space of a month I tried to relieve him by fixed alkali, seneka, Dover's powder, gum ammoniac, squill, &c. but without effect. I then directed Infusion of Digitalis, which soon increased the flow of urine, without exciting nausea, and in a few days removed all his complaints.

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CASE LXXXIII.—*Jan.* 23d. Mr. Q——, æt. 47. A stone in his bladder for many years; dropsical for the last three months. Had taken at different times soap with squill and gum ammoniac; soap lees; chrystals of tartar, oil of juniper, seneka, jalap, &c. but the dropsical symptoms still increased, and the dysuria from the stone became very urgent. I now directed a dram of the Fol. Digit. siccat. in a half pint infusion, half an ounce to be given every six hours. This presently relieved the dysuria, and soon removed the dropsy, without any disturbance to his system.

CASE LXXXIV.—*Jan.* 27th. Mr. D——, æt. 86. The debility of age and dropsical legs had long oppressed him. A few weeks before his death his breathing became very short, he could not lie down in bed, and his urine was small in quantity. A wine-glass of a weak Infusion of Digitalis, warmed with aromatics, was ordered to be taken twice a day. It afforded a temporary relief, but he did not long survive.

Case LXXXV.—*Jan.* 28th. Mr. D——, æt. 35. A publican and a hard drinker. Ascites, anasarca, diseased viscera, and slight attacks of hæmoptoe. A dram of Fol. Digital. sicc. in a half pint infusion, of which one ounce was given night and morning, proved diuretic and removed his dropsy. He then took medicines calculated to relieve his other complaints. The dropsy did not return during my attendance upon him, which was three or four weeks. A quack then undertook to cure him with blue vitriol vomits, but, as I am informed, he presently sunk under that rough treatment.

Case LXXXVI.—*Jan.* 29th. Mrs. O——, of D——, æt. 53. A constant and distressing palpitation of the heart, with great debility. From a degree of anasarca in rhe legs I was led to suspect effusion in the pericardium, and therefore directed Digitalis, but it produced no benefit. She then took various other medicines with the same want of success, and about ten months afterwards died suddenly.

Case LXXXVII.—*Jan.* 31st. Mr. T——, of A——, æt. 81. Great difficulty of breathing, so that he had not lain in bed for the last six weeks, and some swelling in his legs. These complaints were subsequent to a very severe cold, and he had still a troublesome cough. He told me that at his age he did not look for a cure, but should be glad of relief, if it could be obtained without taking much medicine. I directed an

Infusion of Digitalis, a dram to eight ounces, one spoonful to be taken every morning, and two at night. He only took this quantity; for in four days he could lie down, and soon afterwards quitted his chamber. In a month he had a return of his complaints, and was relieved as before.

CASE LXXXVIII.—*Jan.* 31st. Mrs. J——, of S——, æt. 67. A lusty woman, of a florid complexion, large belly, and very thick legs. She had been kept alive for some years by the discharge from ulcers in her legs; but the sores now put on a very disagreeable livid appearance, her belly grew still larger, her breath short, her pulse feeble, and she could not take nourishment. Several medicines having been given in vain, the Digitalis was tried, but with no better effect; and in about a month she died.

CASE LXXXIX.—*Feb.* 2d. Mr. B——, æt. 73. An universal dropsy. He took various medicines, and Digitalis in small doses, but without any good effect.

CASE XC.—*February* 24th. Master M——, of W——, æt. 10. An epilepsy of some years continuance, which had never been interrupted by any of the various methods tried for his relief. The Digitalis was given for a few days, but as he lived at a distance, so that I could not attend to its effects, he only took one half pint infusion, which made no alteration in his complaint.

Case XCI.—*March* 6th. Mr. H———, æt. 62. A very hard drinker, and had twice had attacks of apoplexy. He had now an ascites, was anasarcous, and had every appearance of a diseased liver. Small doses of calomel, Dover's powder, infusum amarum, and sal sodæ palliated his symptoms for a while; these failing, blisters, squills, and cordials were given without effect. A weak Infusion of Digitalis, well aromatised, was then directed to be given in small doses. It rather seemed to check than to increase the secretion of urine, and soon produced sickness. Failing in its usual effect, the medicine was no longer continued; but every thing that was tried proved equally inefficacious, and he did not long survive.

Case XCII.—*May* 10th. Mrs. P———, æt. 40. Spasmodic asthma of many years continuance, which had frequently been relieved by ammoniacum, squills, &c. but these now failing in their wonted effects, an Infus. of Fol. Digitalis was tried, but it seemed rather to increase than relieve her symptoms.

Case XCIII.—*May* 22d. Mr. O———, of B———, æt. 61. A very large man, and a free liver; after an attack of hemiplegia early in the spring, from which he only partially recovered, became dropsical. The dropsy occupied both legs and thighs, and the arm of the affected side. I directed an Infusion of Digitalis in small doses, so as not to affect his stomach. The swellings gradually subsided, and, in the course of the summer, he recovered perfectly from the palsy.

CASE XCIV.—*July* 5th. Mr. C———, of W———, æt. 28, had drank very freely both of ale and spirits; and in consequence had an ascites, very large legs, and great fulness about the stomach. He was ordered to take Infusion of Digitalis night and morning for a few days, and then to keep his bowels open with chrystals of tartar. The first half-pint of infusion relieved him greatly; after an interval of a fortnight it was repeated, and he got well without any other medicine, only continuing the chrystals of tartar occasionally. I forgot to mention that this gentleman, before I saw him, had been for two months under the care of a very celebrated physician, by whose direction he had taken mercurials, bitters, squills, alkaline salts, and other things, but without much advantage.

CASE XCV.—*March* 6th. Mrs. W———, æt. 36. In the last stage of a pulmonary consumption, took the Infus. Digitalis, but without any advantage.

CASE XCVI.—*August* 20th. Mr. P———, æt. 43. In the year 1781, he had a severe peripneumony, from which he recovered with difficulty. At the date of this, when he first consulted me, the symptoms of hydrothorax were obvious. I directed a purge, and then the Infusum Digitalis, three drams to half a pint, one ounce to be taken every four hours. It made him sick, and occasioned a copious discharge of urine. His complaints immediately vanished, and he remains in perfect health.

Case XCVII.—*September* 24th. Mrs. R———, of B———, æt. 35, the mother of many children. After her last lying-in, three months ago, had that kind of swelling in one of her legs which is mentioned at No. VIII. XXVI. and XXXI. A considerable degree of swelling still remained; the limb was heavy to her feeling, and not devoid of pain. I directed a bolus of five grains of Pulv. Digitalis, and twenty-five of crude quicksilver rubbed down, with conserve of cynosbat. to be taken at bed-time, and afterwards an Infusion of red bark and Fol. Digitalis to be taken twice a day. There was half an ounce of bark and half a dram of the leaves in a pint infusion: the dose two ounces.

The leg soon began to mend, and two pints of the infusion finished the cure.

Case XCVIII.—*September* 25th. Mr. R———, æt. 60. Complained to me of a sickness after eating, and, for some weeks past, he had thrown up all his food soon after he had swallowed it. He had taken various medicines, but found benefit from none, and had tried various kinds of diet. He was now very thin and weak, but had a good appetite. As several very probable methods had been prescribed, and as the usual symptoms of organic disease were absent, I determined to give him a spoonful of the Infusion of Digitalis twice a day; made by digesting two drams of the dried leaves in half a pint of cinnamon water. From the time he began to take this medicine, he suffered no return of his complaint, and soon recovered his flesh and his strength.

It should be observed, that I had frequently seen the Digitalis remove sickness, though prescribed for very different complaints.

Case XCIX.—*September* 30th. Mrs. A———, æt. 38. Hydrothorax and anasarca. Her chest was very considerably deformed. One half-pint of the Digitalis Infusion entirely cured her.

Case C.—*September* 30th. Mr. R———, of W———, æt. 47. Hydrothorax and anasarca. An Infusion of Digitalis was directed, and, after the expected effects from that should take place, sixty drops of tincture of cantharides twice a day. As he was costive, pills of aloes and steel were ordered to be taken occasionally.

This plan succeeded perfectly. About a month afterwards he had some rheumatic affections, which were removed by guiacum.

Case CI.—*October* 2d. Mrs. R———, æt. 60. Diseased viscera; ascites and anasarca. Had taken various deobstruent and diuretic medicines to little purpose. The Digitalis brought on a nausea and languor, but had no effect on the kidneys.

Case CII.—*October* 12th. Mr. R———, æt. 41. A publican and a hard drinker. His legs and belly greatly swollen, appetite gone, countenance yellow, breath very short, and cough troublesome. After a vomit I gave him calomel, saline draughts, steel, bitters, &c. He had taken the more usual diuretics before I saw him. As the dropsical symptoms increased, I changed his medicines for pills made of soap, containing two grains of Pulv. Fol. Digital. in each dose, and, as he was costive, two grains of jalap. He took them twice a day, and in a week was free from every appearance of dropsy. The jaundice soon afterwards vanished, and tonics restored him to perfect health.

Case CIII.—*October* 12th. Mr. B———, æt. 39, kept a public house, drank very freely, and became dropsical: he complained also of rheumatic pains. I directed Infusion of Digitalis, half an ounce twice a day. In eight days, the swellings in his legs and the fulness about his stomach disappeared. His rheumatic affections were cured by the usual methods.

Case CIV.—*October* 22d. Master B———, æt. 3. Ascites and universal anasarca. Half a grain of Fol. Digital. siccat. given every six hours produced no effect; probably the medicine was wasted in giving. An infusion of the dried leaf was then tried, a dram to four ounces, two teaspoonfuls for a dose; this soon increased the flow of urine to a very great degree, and he got perfectly well.

Case CV.—*October* 30th. Mr. G———, of W———, æt. 88. The gentleman mentioned in No. XLVII. His complaints and manner of living the same as there mentioned. I ordered an Infusion of the Digitalis, a dram and a half to half a pint; one ounce to be taken twice a day; which cured him in a short time.

On *March* the 23d, 1784, he sent for me again. His complaints were the same, but he was much more feeble. On this account, I directed a dram of the Fol. Digitalis to be infused for a night in four ounces of spirituous cinnamon-water, a spoonful to be taken every night. This had not a sufficient effect; therefore, on the 22d of *April*, I ordered the infusion prescribed two years before, which soon removed his complaints.

He died soon afterwards, worn out, in his ninetieth year.

Case CVI.—*November* 2d. Mr. S———, of B——h——, æt. 61. Hydrothorax and swelled legs. Squills were given for a week in very full doses, and other modes of relief attempted; but his breathing became so bad, his countenance so livid, his pulse so feeble, and his extremities so cold, that I was apprehensive upon my second visit that he had not twenty-four hours to live. In this situation, I gave him the Infusum Digitalis stronger than usual:—viz. two drams to eight ounces. Finding himself relieved by this, he continued to take it, contrary to the directions given, after the diuretic effects had appeared.

The sickness which followed was truly alarming: it continued at intervals for many days, his pulse sunk down to forty in a minute, every object appeared green to his eyes, and between the exertions of reaching he lay in a state approaching to syncope. The strongest cordials, volatiles, and repeated blisters barely supported him. At length, however, he did begin to emerge from the extreme danger into which his folly had plunged him; and by generous living and tonics, in about two months he again enjoyed a perfect state of health.

CASE CVII.—*Nov.* 19th. Master S———, æt. 8. Ascites and anasarca. A dram of Fol. Digitalis in a six-ounce infusion, given in doses of a spoonful, effected a perfect cure, without producing nausea.

1783.

The reader will, perhaps, remark, that from the middle of January to the 1st of May, not a single case occurs, and that the amount of cases is likewise less than in the preceding or ensuing years. To prevent erroneous conjectures or conclusions, it may be expedient to mention, that the ill state of my own health obliged me to retire from business for some time in the spring of the year, and that I did not perfectly recover until the following summer.

CASE CVIII.—*January* 15th. Mrs. G———, æt. 57. A very fat woman; has been dropsical since November last; with symptoms of diseased viscera. Various remedies having been taken without effect, an Infusion of Digitalis was directed twice a day, with a view to palliate the more urgent symptoms. She took it four days without relief, and as her recovery seemed impossible, it was urged no farther.

Case CIX.—*May* 1st. Mrs. D——, æt. 72. A thin woman, with very large anasarcous legs and thighs; no appetite, and general debility. After a month's trial of cordials and diuretics of different kinds, the surgeon who had scarified her legs apprehended they would mortify; she had very great pain in them, they were very red and black by places, and extremely tense. It was evident that unless the tension could be removed, gangrene must soon ensue. I therefore gave her Infusum Digitalis, which increased the secretion of urine by the following evening, so that the great tension began to abate, and together with it the pain and inflammation. She was so feeble that I dared not to urge the medicine further, but she occasionally took it at intervals, until the time of her death, which happened a few weeks afterwards.

Case CX.—*May* 18th. I was desired to prescribe for Mary Bowen, a poor girl, at Hagley. Her disease appeared to me to be an ovarium dropsy. In other respects she was in perfect health. I directed the Digitalis to be given till it should affect her very considerably. It was done; but the patient's size is not reduced: she is otherwise very well.

Case CXI.—*May* 25th. Mr. G——, æt. 28. In the last stage of a pulmonary consumption of the scrophulous kind, took an Infusion of Digitalis, but without any advantage.

Case CXII.—*May* 31st. Mr. H———, æt. 27. In the last stage of a phthisis pulmonalis became dropsical. He took half a pint of the Infusum Digitalis in six days, but without any sensible effect.

Case CXIII.—*June* 3d. Master B———, of D———, æt. 6. With an universal anasarca, had an extremely troublesome cough. An opiate was given to quiet the cough at night, and two tea spoonfuls of Infus. Digit. were ordered every six hours. The dropsy was presently removed; but the cough continued, his flesh wasted, his strength failed, and some weeks afterwards he died tabid.

Case CXIV.—*June* 19th. Mrs. L———, æt. 28. A dropsy in the last stage of a phthisis. Infusum Digitalis was tried to no purpose.

Case CXV.—*June* 20th. Mrs. H———, æt. 46. A very fat short woman; had suffered severely through the last winter and spring from what had been called asthma; but for some time past an universal anasarca prevailed, and she had not lain down for several weeks. After trying vitriolic acid, tincture of cantharides, squills, &c. without advantage, she took half a pint of Infus. Digitalis in three days. In a week afterwards the dropsical symptoms disappeared, her breath became easy, her appetite returned, and she recovered perfect health. The infusion neither occasioned sickness nor purging.

Case CXVI.—*June* 24th. Mrs. B———, æt. 40. A puerperal fever, and swelled legs and thighs. The fever not yielding to the usual practice, I directed an Infusion of Fol. Digitalis. It proved diuretic; the swellings subsided, but the fever continued, and a few days afterwards, a diarrhœa coming on, she died.

Case CXVII.—*July* 22d. Mr. F———, æt. 48. A strong man, of a florid complexion, in consequence of intemperance became dropsical, with symptoms of diseased viscera, great dyspnœa, a very troublesome cough, and total loss of appetite. He took mild mercurials, pills of soap, rhubarb, and tartar of vitriol, with soluble tartar, and dulcified spirits of nitre in barley water. After a reasonable trial of this plan, he took squill every six hours, and a solution of asafœtida and gum ammoniac, to ease his breathing. Finding no relief, I gave him chrystals of tartar with ginger; but his remaining health and strength daily declined, and he was not at all benefited by the medicines. I was averse to the use of Digitalis in this case, judging from what I had seen in similar instances of tense fibre, that it would not act as a diuretic. I therefore once more directed squill, with decoction of seneka and sal sodæ; but it was inefficacious. His strength being much broken down, I then ordered gum ammoniac, with small doses of opium, and infusum amarum, continuing the squill at intervals. At length I was urged to give the Digitalis, and considering the case as desperate, I agreed to do it. The event was as I expected; no increase in the urine took place; and the medicine being still continued, his pulse became slow, and he apparently sunk under its sedative effects. He was neither purged nor vomited; and had the Digitalis either been omitted altogether, or suspended upon its first effects upon the pulse being observed, he might perhaps have existed a week longer.

Case CXVIII.—*July* 26th. Mr. W———, of W———, æt. 47. Phthisis pulmonalis, jaundice, ascites, and swelled legs. As it was probable that the only relief I could give in a case so circumstanced, would be by carrying off the effused fluids, I tried squill and fixed alkali; and these failing, I ordered the Infusum Digitalis. This had the desired effect, and, I believe, prolonged his life a few weeks.

Case CXIX.—*August* 15th. Mrs. C———, æt. 60. Ascites, anasarca, diseased viscera, paucity of urine, and total loss of appetite. These complaints had heretofore existed repeatedly, and had been removed by deobstruent and diuretic medicines; but in this attack the symptoms were suffered to exist a longer time and in a greater degree, before assistance was sought for. The remedies that used to relieve her were now exhibited to no purpose. Mild mercurials, soap, rhubarb, and squill were tried; but she grew rapidly worse. Saline draughts with acetum scilliticum seemed for a few days to check the progress of her complaint, but they soon lost their effect, and diarrhœa ensued upon every attempt to increase the frequency of the dose. Draughts with Infus. Digital. were then directed to be taken twice a day. The effect was a powerful action on the kidneys, and a reduction of the swellings, but without sickness. A degree of appetite returned, but still the tendency to diarrhœa existed, and kept her weak. Tonic medicines were then tried, but without advantage, and in a month it was necessary to have recourse to the Digitalis again. It was directed in a half-pint mixture; an ounce to be taken thrice in twenty-four hours. On the 2d day, finding her symptoms very much relieved, she took, in the absence of her nurse, nearly a double dose of the medicine. The consequence was great sickness, langour continuing for several days, and almost a total stop to the secretion of urine, from the time the sickness commenced.

The case now became totally unmanageable in my hands, and, after a fortnight, I was dismissed, and another physician called in; but she did not long survive.

This was not the first, nor the last instance, in which I have seen too large a dose of the medicine defeat the very purpose for which it was directed.

Case CXX.—*August* 22d. Mrs S———, æt. 36. Extreme faintness; anasarcous legs and thighs; great difficulty of breathing, troublesome cough, frequent chilly fits succeeded by hot ones; night sweats, and a tendency to diarrhœa. Apprehensive that the more urgent symptoms were caused by water in the lungs, I directed an Infusion of Digitalis, with an ounce of diacodium to the half pint to prevent it purging, a wine glass full to be taken every night at bed-time, and a mixture with confect. cardiac. and pulv. ipecac. to be given in small doses after every loose stool.

On the fourth day she was better in all respects; had made a large quantity of water, and did not purge. In a few days more she lost all her complaints, except the cough, which gradually left her, without any further assistance.

I was agreeably deceived in the event of this case, for I expected after the water was removed, to have had a phthisis to contend with.

Case CXXI.—*Aug.* 25th. T——— W———, Esq. æt. 50. A free liver, diseased viscera, belly very tense, and much swollen; fluctuation perceptible, but the swelling circumscribed; pulse 132. This gentleman was under the care of my very worthy friend Dr. Ash, who, having tried various modes of cure to no purpose, asked me if I thought the Digitalis would answer in this case. I replied that it would not, for I had never seen it effectual where the swelling appeared very tense and circumscribed. It was tried, however, but did not lessen the swelling. I mention this case, to introduce the above remark, and also to point out the great effect the Digitalis has upon the action of the heart; for the pulse came down to 96. He was afterwards tapped, and continued for some time under our joint attendance, but the pulse never became quicker, nor did the swelling return.

CASE CXXII.—*September* 7th. Mr. L———, æt. 43. After several severe attacks of ill formed gout, attended for some time past with jaundice and other symptoms of diseased viscera, the consequences of intemperate living, was sent to Buxton; from whence he returned in three weeks with ascites and anasarca. Under this complicated load of disease, I prescribed repeatedly without advantage, and at length gave him the Digitalis, which carried off the more obvious symptoms of dropsy; but the jaundice, loss of appetite, diseased viscera, &c. rendered his recovery impossible.

1784.

CASE CXXIII.—*Feb.* 12th. Mrs. C———, æt. 54. A strong short woman of a florid complexion; complained of great fulness across the region of the stomach; short breath, a troublesome cough, loss of appetite, paucity of urine; and had a brownish yellow tinge on her skin and in her eyes. She dated these complaints from a fall she had through a trap door about the beginning of winter. From the beginning of January to this time, she had been repeatedly let blood, had taken calomel purges with jalap; pills of soap, rhubarb, and calomel; saline julep with acet. scillit. nitrous decoction, garlic, mercury rubbed down, infus. amarum purg. &c. After the failure of medicines so powerful, and seemingly so well adapted, and during the use of which all the symptoms continued to increase, it was evident that a favourable event could not be expected. However, I tried the Infusum Digitalis, but it did nothing. I then gave her pills of quicksilver, soap, and squill, with decoction of dandelion, and after some time, chrystals of tartar with ginger. Nothing succeeded to our wishes, and the increase of orthopnœa compelled me occasionally to relieve her by drastic purges, but these diminished her strength more in proportion than they relieved her symptoms. Tincture of cantharides, sal diureticus, and various other means were occasionally tried, but with very little effect, and she died towards the end of March.

Case CXXIV.—*March* 31st. Miss W———, æt. 60. Had been subject to peripneumonic affections in the winter. She had now total loss of appetite, very great debility, difficult breathing, much cough, a considerable degree of expectoration, and a paucity of urine. She had been blooded, taken soap, asaf. and squill, afterwards asaf. and ammon. with acet. scillit.: but all her complaints increasing, a blister was applied to her back, and the Digitalis infusion directed to be taken every night. The effect was an increased secretion of urine, a considerable relief to her breath, and some return of appetite; but soon afterwards she became hectic, spat purulent matter, and died in a few weeks.

Case CXXV.—*April* 12th. Mrs. H———,

of L———, æt. 61. In *December* last this lady, then upon a visit in London, was attacked with severe symptoms of peripneumony. She was treated as an asthmatic patient, but, finding no relief, she made an effort to return to her home to die. In her way through this place, the latter end of *December*, I was desired to see her. By repeated bleedings, blisters, and other usual methods, she was so far relieved, that she wished to remain under my care. After a while she began to spit matter and became hectic. With great difficulty she was kept alive during the discharge of the abscess, and about the end of *March* she had swollen legs, and unequivocal symptoms of dropsy in the chest. Other diuretics failing, on the 12th of *April* I was induced to give her the Digitalis in small doses. The relief was great and effectual. After an interval of fifteen days, some swellings still remaining in the legs, I repeated the medicine, and with such good effect, that she lost all her complaints, got a keen appetite, recovered her strength, and about the end of *May* undertook a journey of fifty miles to her own home, where she still remains in perfect health.

CASE CXXVI.—*April* 17th. Mr. F———, æt. 59. A very fat man, and a free liver; had long been subject to what was called asthma, particularly in the winter. For some weeks past his legs swelled, he had great sense of fulness across his stomach; a severe cough; total loss of appetite, thirst great, urine small in quantity, his breathing so difficult that he had not lain down in bed for several nights. Calomel, gum ammoniac, tincture of cantharides, &c. having been given in vain, I ordered two grains of pulv. Fol. Digitalis made into pills with aromatic species and syrup, to be given every night. On the third day his urine was less turbid; on the fourth considerably increased in quantity, and in ten days more he was free from all complaints, and has since had no relapse.

Case CXXVII.—*May* 7th. Miss K———, æt. 8. After a long continued ague, became hectic and dropsical. Her belly was very large, and she had a total loss of appetite. Half a grain of Fol. Digital. pulv. with two gr. of mer. alcalis. were ordered night and morning, and an infusion of bark and rhubarb, with steel wine to be given in the day time. Her belly began to subside in a few days, and she was soon restored to health. Two other children in the family, affected nearly in the same way, had died, from the parents being persuaded that an ague in the spring was healthful and should not be stopped.—I know not how far the recovery in this case may be attributed to the Digitalis, but the child was so near dying that I dared not trust to any less efficacious diuretic.

Case CXXVIII.—*June* 13th. Mr. C———, æt. 45. A fat man; had formerly drank hard, but not latterly: last March began to complain of difficult breathing, swelled legs, full belly, but without fluctuation, great thirst, no appetite; urine thick and foul; complexion brownish yellow. Mercurial medicines, diuretics of different kinds, and bitters had been trying for the last three months, but with little advantage. I directed two grains of the Fol. Digital. in powder to be taken every night, and infus. amar. with tinct. sacr. twice a day. In three days the quantity of his urine increased, in ten or twelve days all his symptoms disappeared, and he has had no relapse.

CASE CXXIX.—*June* 17th. Mr. N———, of W———, æt. 54. A large man, of a pale complexion; had been subject to severe fits of asthma for some years, but now worse than usual. The intermitting pulse, the great disturbance from change of posture, and the swollen legs induced me to conclude that the exacerbation of his old complaint was occasioned by serous effusion. I directed pills with a grain and half of the pulv. Digital. to be taken every night, and, as he was costive, jalap made a part of the composition. He was also directed to take mustard-seed every morning, and a solution of asafœtida twice in the day. The effect of this plan was perfectly to our wishes, and in a short time he recovered his usual health. About half a year afterwards he died apoplectic.

CASE CXXX.—Mary B———. A young unmarried woman. Her disease appeared to me a dropsy of the right ovarium. She took an infusion of Digitalis, but, as I expected, with no good effect. She is still, I am informed, nearly in the same state.

Case CXXXI.—*July* 12th. Mrs. A———, of C———, æt. 56. After a series of indispositions for several years, became dropsical: and had long been confined to her chamber, unable to lie down or to walk. She was so feeble, her legs so much swollen, her breath so short, and the symptoms of diseased viscera so strong, that I dared not to entertain hopes of a cure; but wishing to relieve her more urgent symptoms, directed quicksilver rubbed down and Fol. Digital. pulv. to be made into pills: the dose, containing two grains of the latter, to be given night and morning. She was also ordered to take a draught with a dram of æther twice a day, and to have scapulary issues. Her breathing was so much relieved, that she was able soon afterwards to come down stairs; but her constitution was too much broken to admit of a recovery.

Case CXXXII.—*July* 16th. Mr. B———, of W———, æt. 31. After a tertian ague of twelve months' continuance suffered great indisposition for ten months more. He chiefly complained of great straitness and pain in the hypochondriac region, very short breath, swelled legs, want of appetite. He had been under the care of some very sensible practitioners, but his complaints increased, and he determined to come to Birmingham. I found him supported upright in his chair by pillows, every attempt to lean back or stoop forward giving him the sensation of instantaneous suffocation. He said he had not been in bed for many weeks. His countenance was sunk and pale; his lips livid; his belly, thighs, and legs very greatly swollen; hands and feet cold, the nails almost black, pulse one hundred and sixty tremulous beats in a minute, but the pulsation in the carotid arteries was such as to be visible to the eye, and to shake his head so that he could not hold it still. His thirst was very great, his urine small in quantity, and he was disposed to purge. I immediately ordered a spoonful of the infusum Digitalis every six hours, with a small quantity of laudanum, to prevent its running off by stool, and decoction of leontodon taraxacum to allay his thirst. The next day he began to make water freely, and could allow of being put into bed, but was raised high with pillows. Omit the infusion. That night he parted with six quarts of water, and the next night could lie down and slept comfortably. *July* 21st he took a mild mercurial bolus. On the 25th the diuretic effects of the Digitalis having nearly ceased, he was ordered to take three grains of the pulv. Digital. night and morning, for five days, and a draught with half an ounce of vin. chalyb. twice a day. *August* 15th. He took a purge of calomel and jalap, and some swelling still remaining in his legs, the Digitalis infusion was repeated. The water having been thus entirely evacuated, he was ordered saline draughts with acetum scilliticum and pills of salt of steel and extract of gentian. About a month after this, he returned home perfectly well.

Case CXXXIII.—*July* 28th. Mr. A———, of W———, æt. 29, became dropsical towards the close of a pulmonary consumption. He was ordered 12 grains of pulv. fol. cicutæ and 1 of Digitalis twice a day. No remarkable effect took place.

Case CXXXIV.—*July* 31. Mr. M———, æt. 37. Hydrothorax. A single grain of Fol. Digital. pulv. taken every night for three weeks cured him. The medicine never made him sick, but increased his urine, which became clear; whereas before it had been high-coloured and turbid.

Case CXXXV.—*August* 6th. Mr. C———, of B———, æt. 42. Asthma and anasarca, the consequence of free living. He had been for some time under the care of an eminent physician of this place, but his complaints proving unusually obstinate, he consulted me. I directed an infusion of Digitalis to be taken every night, and a mixture with squill and tincture of cantharides twice every day. In about a week he became better, and continued daily mending. He has since enjoyed perfect health, having quitted a line of business which exposed him to drink too much.

Case CXXXVI.—*August* 6th. Mr. M———, of C———, æt. 44. Ascites and anasarca, preceded by symptoms of the epileptic kind. He was ordered to take two grains of pulv. Digitalis every morning, and three every night; likewise a saline draught with syrup of squills, every day at noon. His complaints soon yielded to this treatment, but in the month of November following he relapsed, and again asked my advice. The Digitalis alone was now prescribed, which proved as efficacious as in the first trial. He then took bitters twice a day, and vitriolic acid night and morning, and now enjoys good health.

Before the Digitalis was prescribed, he had taken jalap purges, soluble tartar, salt of steel, vitriol of copper, &c.

CASE CXXXVII.—*Aug*. 10th. Mrs. W———, æt. 55. An anasarcous leg, and sciatica; full habit. After bleeding and a purge, a blister was applied in the manner recommended by Cotunnius; and two grains of Fol. Digital. with fifteen of fol. cicutæ were directed to be taken night and morning. The medicine acted only as a diuretic; the pain and swelling of the limb gradually abated; and I have not heard of any return.

I must here bear witness to the efficacy of Cotunnius's method of blistering in the sciatica, having used it in a great number of cases, and generally with success.

CASE CXXXVIII.—*Aug*. 16. Mrs. A———, of S———, æt. 78. About the middle of summer began to complain of short breath, great debility, and loss of appetite. At this time there were evident marks of effusion in the thorax, and some swelling in the legs. The advanced age, the weakness, and other circumstances of this patient, precluded every idea of her recovery; but something was to be attempted. Squills and other remedies had been tried; I therefore directed pills with two or three grains of the pulv. Digitalis to be taken every night for six nights, and a saline draught with forty drops of acetum scillit. twice in the day. She took but few of the draughts, seldom more than half one at a time, for they purged her, and she disliked them. The pills she took regularly, and with the happiest effect, for she could lie down, her breath was very much relieved, and a degree of appetite returned. *Sept.* 4th, some return of her symptoms demanded the further use of diuretics. I was afraid to urge the Digitalis in so hazardous a subject, and therefore directed tinct. amara with tinct. canthar. and pills of squill, seneka, salt of tartar and gum ammoniac. These medicines did not at all check the progress of the disease, and on the 26th it became necessary to give the Digitalis again. The pills were therefore repeated as before, and infus. amarum with fixed alkali ordered to be taken twice a day. The event was as favourable as before; and from this time she had no considerable return of dropsy, but languished under various nameless symptoms, until the middle or end of November.

CASE CXXXIX.—*Aug.* 16th. Mrs. P———, of S———, æt. 50. For a particular account of this patient, see Mr. Yonge's second Case.

CASE CXL.—*Sept.* 20th. B——— B———, Esq. A true spasmodic asthma of many years continuance. After every method of relief had failed; both under my management, and also under the direction of several of the ablest physicians of this kingdom; I was induced to give him an infusion of the Digitalis. It was continued until nausea came on, but procured no relief.

CASE CXLI.—*October* 5th. Mr. R——, æt. 43. (*The patient mentioned at No.* CII.) He had pursued his former mode of life, and had now a return of his complaints, with evident marks of diseased viscera. His belly not very large, but uncommonly tense. From this circumstance I did not expect the Digitalis to succeed, and therefore tried for some time to relieve him by the saline julep, with acet scillitic. jalap, mercury, syrup of squill, with aq. cinnam. decoction of dandelion, &c.; but these being administered without advantage, I was driven to the Digitalis. As he was very weak and much emaciated, I only gave two grains night and morning for five days. As no increase of urine took place, I used alkaline salt with tinct. cantharides:—This proving equally unsuccessful; on the 18th, I directed two ounces of the infusum Digitalis night and morning. This was continued until nausea took place, but the kidney secretion was not increased. Squill with opium, deobstruents of different kinds, sublimate solution, fixed alkali, tobacco infusion, were now successively tried, but with the same want of success. The fulness of his belly made it necessary to tap him, and by repeating this operation he continued alive to the end of the year.

Case CXLII.—*Oct.* 19th. Mrs. R———, of B———, æt. 47. Supposed asthma, of eighteen months' duration. She had kept her room for four months, and could not lie down without great disturbance; was very thin, and had totally lost all inclination for food. She was directed to take two gr. of pulv. Fol. Digital. night and morning for five days, and infusum amarum, at the hours of eleven and five. In the course of a week she was much relieved, and could remain in bed all night. After a few days' interval she took the Digitalis for five days more, and was soon well enough to come down stairs and conduct her family affairs.

In *April*, 1785, she had a slight return, but not such as to confine her to her chamber. She experienced the same relief from the same medicine, but continuing it for seven days without interruption, it excited nausea.

Case CXLIII.—*October* 28th. Mr. A———, subject to nephritis calculosa: after an attack of that kind, had still a troublesome sense of weight about his loins, now and then rising to pain, and a degree of dysuria, together with a want of appetite. These symptoms not readily yielding to the usual methods of treatment, I directed an infusion of Digitalis. The fourth dose caused a copious flow of urine; the sixth made him sick, and he was more or less sick at times for three days; but felt no more of his complaints.

I do not believe it is at all necessary to bring on sickness in these cases, but an unexpected absence from town prevented me from seeing him time enough to stop the exhibition of the medicine.

Case CXLIV.—*October* 31st. Mrs. C———, of W———, æt. 67. Asthma, and very thick hard legs of long continuance. The last month or two her breathing worse than usual, her belly swollen, her thighs anasarcous, and her urine in small quantity. After trying garlic, squill, and purgatives without advantage, I directed the Digital. Infus. After taking about five ounces, her urine from thick and turbid, changed to clear and amber coloured, its quantity considerably increased, and her breathing easy. Contrary to my orders, but impelled by the relief she had found, she finished the remaining three ounces of the infusion, which made her very sick, and the free flow of urine immediately ceased. No medicine was administered for a fortnight, during which time her complaints increased. I then directed an infusion of tobacco, which affected her head, but did not increase her urine. She had recourse again to the Digitalis infusion, which once more removed the fulness of the belly, reduced the swellings of her thighs, and relieved her breath, but had no effect upon her legs.

Case CXLV.—*November* 2d. Miss B———, of C———, æt 22. A very evident fluctuation in the abdomen, which was considerably distended, whilst the rest of her frame was greatly emaciated. The presence of cough, hectic fever, and other circumstances made it probable that this apparent ascites was caused by a purulent, and not a watery effusion. However, it was possible I might be mistaken; the Digitalis was therefore given, but without any advantage.

The further progress of the disease confirmed my first opinion, and she died consumptive.

Case CXLVI.—*Nov.* 4th. Mr. P———, of M———, æt. 40. Subject to troublesome nephritic complaints, and, after the last attack did not recover or void the gravelly concretions as usual, a sense of weight across his loins continuing very troublesome. The usual medicines failing to relieve him, I ordered four grains of pulv. Digital. to be taken every other night for a week, and fifteen grains of mild fixed vegetable alkali to be swallowed twice a day in barley water. He soon lost all his complaints; but we must not, in this case, too hastily attribute the cure to the Digitalis, as the alkali has also been found a very useful medicine in similar disorders.

Case CXLVII.—*Nov.* 4th. Mr. B———, of N———, æt. 60, had been much subject to gout, but his constitution being at length unable to form regular fits, he became dropsical. Pulv. Fol. Digital. in doses of two or three grains, at bed-time, gave him some relief, but did not perfectly empty him. About three months afterwards he had occasion to take it again; but it then produced no effect, and he was so debilitated that it was not urged further.

Case CXLVIII.—*Nov.* 8th. Mr. G———, æt. 35. In the last stage of phthisis pulmonalis, was attacked with a most urgent and painful difficulty of breathing. Suspecting this distress might arise from watery effusion in the chest, I gave him Digitalis, which relieved him considerably: and during the remainder of his life his breathing never became so bad again.

Case CXLIX.—*Nov.* 13th. Mrs. A———, of W——h——, æt. 68. One of those rare cases in which no urine is secreted. It proved as refractory as usual to remedies, and never having succeeded in the cure of this disease, I determined to try the Digitalis. It was given in infusion, and, after a few doses, the secretion of a small quantity of urine seemed to justify the attempt. The next day, however, the secretion ceased, nor could it be excited again, though at last the medicine was urged so as to occasion sickness, which continued at intervals for three days.

Case CL.—*Nov.* 20th. Mrs. B———, æt. 28. In the last stage of pulmonary consumption became dropsical. I directed three grains of the pulv. Digital. to be taken daily, one in the morning, and two at night. She took twenty grains without any sensible effect.

Case CLI.—*Nov.* 23d. Master W———, æt. 7. Supposed hydrocephalus internus. A grain of pulv. Fol. Digitalis was directed night and morning. After three days, no sensible effects taking place, it was omitted, and the mercurial plan of treatment adopted. The child lived near five months afterwards. Upon dissection near four ounces of water were found in the ventricles of the brain.

CASE CLII.—*Nov.* 26th. Mrs. W———, æt. 65. I had attended this lady last winter in a very severe peripneumony, from which she narrowly escaped with her life. When the cold season advanced this winter, she perceived a difficulty in breathing, which gradually became more and more troublesome. I found her much harassed by a cough, which occasioned her to expectorate a little: the least motion increased her dyspnœa; she could not lie down in bed; her legs were considerably swelled, her urine small in quantity. I directed two grains of pulv. Digitalis made into a pill with gum ammoniac, to be taken every night, and, to promote expectoration, a squill mixture twice in the day. Her urine in five days became clear and copious, and in a fortnight more she lost all her complaints, except a cough, for which she took the lac ammoniacum.

It is not improbable that the squill might have some share in this cure.

CASE CLIII.—*December* 7th. Mr. H———, æt. 42. A large fat man, very subject to gravelly complaints. After an attack in the usual manner, continued to feel numbness in his lower limbs, and a sense of weight across his loins. I directed infusum Digitalis to be given every six hours. Six ounces made him sick, and he took no more. The next day his urine increased, a good deal of sand passed with it, and he lost his disagreeable feels, but the sickness did not entirely cease before the fourth day from its commencement.

Case CLIV.—*December* 27th. Mr. B———, of H———, æt. 55. Symptoms of hydrothorax, at first obscurely, afterwards more distinctly marked. Many things were tried, but the squill alone gave relief. At length this failed. About the third month of the disease, a grain of pulv. Digital. was ordered to be taken night and morning. This produced the happiest effects. In *March* following, he had some slight symptoms of relapse, which were soon removed by the same medicine, and he now enjoys good health. For a more particular narrative see Case the first, communicated by Mr. Yonge.

Case CLV.—*December* 31st. Mrs. B———, of E———, æt. 50. An ovarium dropsy of long continuance. She took three grains of pulv. Digital. every night at bed time, for a fortnight, but without any effect.

Case CLVI.—A poor man in this town, after his kidneys had ceased to secrete urine for several days, was seized with hiccough, fits of vomiting, and transient delirium. After examination I was satisfied the disease was the same as that mentioned at CXLIX. A very experienced apothecary having tried various methods to relieve him, I despaired of any success, but determined to try the Digitalis. It was accordingly given in infusion. At first it checked the vomitings, but did not occasion any secretion of urine.

1785.

The cases which have occurred to me in the course of this year are numerous; but as the events of some of them are not yet sufficiently ascertained, I think it better to withhold them at present.

HOSPITAL CASES,

Under the Direction of the Author.

The four following cases were drawn out at my request by Mr. Charles Hinchley, late apothecary to the Birmingham Hospital. They are all the hospital cases for which the Digitalis was prescribed by me, whilst he continued in that office.

CASE CLVII.—*March* 15th, 1780. John Butler, æt. 30. Asthma and swelled legs. He was directed to take myrrh and steel every day, and three spoonfuls of infusum Digitalis every night. On the 8th of April, he was discharged, cured of the swellings, and something relieved of his asthmatic affections.

Case CLVIII.—*November* 18th, 1780. Henry Warren, æt. 60. This man had a general anasarca and ascites, and was, moreover, so asthmatic, that, neither being able to sit in a chair nor lie in bed, he was obliged constantly to walk about, or to lean forward against a window or table. You prescribed for him thus:

R. Aq. cinn. spt. ℥iv.
Oxymel. scillit.
Syr. scillit. aa. ℥i. m. cap. cochlear. larg. sexta quaque horâ.

This medicine producing no increased discharge of urine, on the 25th you ordered the infusion of Digitalis, two spoonfuls every four hours. After taking this for thirty-six hours, his urine was discharged in very great quantity, his breath became easy, and the swellings disappeared in a few days, though he took no more of the medicine. On the 2d of *December*, he was ordered myrrh and lac ammoniacum, which he continued until the 23d, when he was discharged cured, and is now in good health.

Case CLIX.—*November* 3d, 1781. Mary Crockett, æt. 40. Ascites and universal anasarca. For one week, she took sal diureticus and tincture of cantharides, but without advantage. On the 10th, you directed the infusion of Digitalis, a dram and half to half a pint, an ounce to be taken every fourth hour. Before this quantity was quite finished, the urine began to be discharged very copiously. The medicine was then stopped, as you had directed. On the 15th, being costive, she took a jalap purge, and on the 24th she was discharged cured.

CASE CLX.—*March* 16th, 1782. Mary Bird, æt. 61. Great fulness about the stomach; diseased liver, and anasarcous legs and thighs. For the first week squill was tried in more forms than one, but without advantage. On the 22d, she began with the Digitalis, which presently removed all the swelling.

She was then put upon the use of aperient medicines and tonics, and on the 1st of *August* was discharged perfectly cured.

The three following Cases were drawn up and communicated to me by Mr. BAYLEY, *who succeeded Mr.* HINCHLEY, *as Apothecary to the Hospital at Birmingham.*

Shiffnal, April 26th, 1785.

DEAR SIR,

During my residence in the Birmingham General Hospital, I had frequent opportunities of seeing the great effects of the Digitalis in dropsy. As the exhibition of it was in the following instances immediately under your own direction, I have drawn them up for your inspection, previous to your publishing upon that excellent diuretic. Of its efficacy in dropsy I have considerable evidence in my possession, but consider myself not at liberty to send you any other cases except those you had yourself the conduct of. The Digitalis is a very valuable acquisition to medicine; and, I trust, it will cease to be dreaded when it is well understood.

I am, sir, your obedient
And very humble servant,
W. Bayley.

Case CLXI.—Mary Hollis, aged 62, was admitted an out-patient of the Birmingham General Hospital, *February* 12th, 1784, labouring under all the effects of hydrothorax; her dread of suffocation during sleep was so great, that she always reposed in an elbow chair. She was directed to take two grains of Digitalis in powder every night and morning, and for a few days found great relief; but, on the eighth day, as she had complained of sickness, and had been considerably purged, she was ordered to desist taking any more of her powders. On the fourteenth day she was ordered an ounce of the following infusion twice in a day: R. Fol. Digital. purp. sicc. ʒiss. aq. bullient. ℔ss. digere per semihoram, colaturæ adde tinct. aromatic ℥i. This infusion did not purge, but sometimes excited nausea, though not sufficient to prevent her from continuing its use. She grew gradually better, and on the 6th of *May* was discharged perfectly cured. The diuretic effects of the Digitalis were in this instance immediate.

Case CLXII.—Edward James, æt. 21. Admitted *March* 20th, 1784. Complained of great difficulty of breathing, pain in his head, and tightness about the stomach, with a trifling swelling of his legs. Ordered pil. scillit. ℈i. ter. de die. On the third day, his legs much more swelled, his breathing more difficult, and in every respect worse; his pulse very small and quick, complained when he turned in bed of something like water rolling from one side of the thorax to the other. A remarkable blueness about the mouth and eyes, and purged considerably from the pil. scill. Ordered to omit the pills, and to take ℥i. of Infus. Digitalis every eight hours; the proportion ʒiss. to eight ounces of water and ℥i. of aq. n. m. sp.—Seventh day, the infusion had neither purged, nor vomited him; he only complained once or twice of giddiness. His belly was now very hard, rather black on the right side the navel, and his legs amazingly swelled. Ordered a bolus with rhubarb and calomel to be taken in the morning, and ℥ii. julep salin. cum tinct. canthar. gutt. forty ter die. Twelfth day, nearly in the same state, except his breathing, which was somewhat more difficult, being now obliged to have his head considerably raised. Persistat—From this day to the thirty-second day he became hourly worse. His belly, which at first was only hard, now evidently contained a large quantity of water, his legs were more swelled, and a large sphacelated sore appeared upon each outer ancle. Respiration was so much obstructed, that he was obliged to sit quite upright to prevent suffocation. He made very little water, not more than eight ounces in a day and a night, and was much emaciated. Ordered his purging bolus again, and ℥ii. of a mixture with sal diuretic. ℥ss. to ℥xii. three times in a day, and a poultice with ale grounds to his legs.

Fifty-fourth day. To this period there was not the least probability of his existing; his legs and thighs were one continued blubber, his thorax quite flat, and his belly so large that it measured within one inch as much as a woman's in this hospital the day she was tapped, and from whom twenty-seven pounds of coagulable lymph were taken. He made about three ounces of water in twenty-four hours: his penis and scrotum were astonishingly swelled, and no discharge from the sores upon his legs. Ordered to take a pill with two grains of powdered Foxglove night and morning. For a few days no sensible effect, but about the sixtieth day he complained of being continually giddy, and had some little pain in his stomach. He now made much more water, and dared to sleep. His appetite, which through the whole of his illness had been very bad, was also better. Sixty-sixth day. Breathing very much relieved, the quantity of water he made was three chamber-pots full in a day and a night, each pot containing two quarts and four ounces, moderately full. Ordered to continue his pills, and his legs, which were very flabby, to be rolled.

Sixty-ninth day. His belly nearly reduced to its natural size, still made a prodigious quantity of water, his appetite very good, habit of body rather lax, and his complexion ruddy. On the 2d of *June*, being still rather weak, he was ordered decoct. cort. ℥ii. ter de die; and on the 12th was discharged from this Hospital perfectly cured.

Mr. Bayley's respectful compliments to Doctor Withering: he sends the case of Edward James, which he believes is pretty correct. He laments not having it in his power to send the measure of his belly, having unfortunately mislaid the tape; he heard from James yesterday, and he is perfectly well.

General Hospital, August 5, 1784.

Case CLXIII.—On the 26th *February*, 1785, Sarah Ford, aged 42, was admitted an out-patient of the Birmingham General Hospital: she complained of considerable pain in her chest, and great difficulty of breathing, her face was much swelled, and her thighs and legs were anasarcous. She had extreme difficulty in making water, and with many painful efforts she did not void more than six ounces in twenty four hours. She had been in this situation about six weeks, during which time she had taken ammoniacum, olibanum, and large quantities of squills, without any other effect than frequent sickness. Upon her commencing an hospital-patient, the following medicine was exhibited. R. gum ammoniac ʒii. pulv.

Fol. Digital, purp. ℈ii. sp. lavand. comp. ut fiat pil. 40. cap. ii. nocte maneque. She continued the use of these pills for a few days without any sensible effect. On the eighth day her breathing was much relieved, her legs and thighs were not so much swelled, and in a day and a night she made five pints of water. By the twelfth day her legs and thighs were nearly reduced to their natural size. She continued to make water in large quantities, and had lost her pain in the thorax. To the 20th of *March* she made rapid advances towards health, when, not a symptom of disease remaining, she was discharged.

COMMUNICATIONS FROM CORRESPONDENTS.

London, Norfolk-Street,
May 31st. 1785.

Sir,

I had the favour of your letter last week; and I shall be very happy if I can give you any intelligence relating to the Foxglove, that can answer the purpose in which you are so laudably engaged.

It is true that my brother, the late Dr. Cawley, was greatly relieved, and his life, perhaps, prolonged for a year, by a decoction of the Foxglove root; but why it had not a more lasting effect, it is necessary I should tell you that he had all the signs of a distempered viscera long before any watery swellings appeared; it was manifest that his dropsy was merely symptomatic, and he could, therefore, only from time to time have any relief from medicine. In the year 1776, he returned from London to Oxon, having consulted several physicians at the former place, and Dr. Vivian at the latter, but without any success; and he was then told of a carpenter at Oxon that had been cured of a Hydrops pectoris by the Foxglove root, and as he was a younger, and in other respects a healthy man, his cure, I believe, remains a perfect one.

I did not attend my brother whilst he took the medicine, and, therefore, I cannot speak precisely to the operation of it; but I remember, by his letters, that he was dreadfully sick and ill for several days before the secretion of urine came on, but which it did do to a great degree, relieved his breath, and greatly lessened the swelling in his legs and thighs; but the two instances I have lately seen in this part of the world are much stronger proofs of the efficacy of it than my brother's case.

I am, &c.

ROBERT CAWLEY.

N.B. Whenever I have another opportunity of giving the Foxglove, it shall be in small doses:— in which I should hope it might succeed, although it might be more slowly. If you should try it with success, I should be glad to know what mode you made use of.

Dr. Cawley's prescription.

R. Rad. Digital. purpur. siccat. et contus. ℥ii.
Coque ex aq. font. ℔ii. ad. ℔i. colat. liquor. adde aq. junip. comp. ℥ii.
Mell. anglic ℥i. m. sumat cochl. iv. omni nocte h. s. et mane.

—I have elsewhere remarked, that when the Digitalis has been properly given, and the diuretic effects produced, that an accidental over-dose bringing on sickness, has stopped the secretion of urine. In the present instance it likewise appears, that violent sickness may be excited, and continue for several days without being accompanied by a flow of urine; and it is probable that the latter circumstance did not take place until the severity of the former abated. If Dr. Cawley had not had a constitution very retentive of life, I think he must have died from the enormous doses he took; and he probably would have died previous to the augmentation of the urinary discharge. For, if the root from which his medicine was prepared was gathered in its active state, he did not take at each dose less than *twelve* times the quantity a strong man ought to have taken. Shall we wonder then that patients refuse to repeat such a medicine, and that practitioners tremble to prescribe it? Were any of the active and powerful medicines in daily use to be given in doses *twelve* times greater than they are, and these doses to be repeated without attention to the effects, would not the patients die, and the medicines be condemned as dangerous and deleterious?—Yet such has been the fate of Foxglove!

A Letter to the Author, from Mr. BODEN, *Surgeon, at Broseley, in Shropshire.*

Broseley, 25th May, 1785.

DEAR SIR,

HAVE enclosed the prescriptions that contained the Fol. Digital. which I gave to Thomas Cooke and Thomas Roberts.

Thomas Cooke, æt. 49, had been ill about two or three weeks. When I saw him he had no appetite and a constant thirst: a fulness and load in the stomach: the thighs, legs, and hands much swelled, and the face and throat in a morning; was costive, and made but little water, which was high coloured; the pulse very weak, and his breath exceeding bad. *June* 17th, R. Argent. viv. ʒi. cons. cynosbat. ℈ii. Fol. Digital. pulv. gr. xv. f. pil. xxiv. capt. ii. omni nocte horâ decubitus. He was, likewise, purged by a bolus of argent. viv. jalap, Digit. elaterium and calomel, which was repeated on the fourth day, to the third time. From *June* 17th to the 29th the symptoms were mostly removed, making water freely, and having plenty of stools; in a week after he was perfectly well, and remains so ever since. The cure was finished by steel and bitters.

Thomas Roberts, æt. 40, had a deformed chest, was obliged to be almost in an erect posture when in bed; the other symptoms were nearly the same as Cooke's. *August* 3d. The pills prescribed *June* 17th for Cooke.—17th. A purging bolus of jalap and Digitalis once a week. He continued the medicines till the latter end of *August*, when he got very well; but the complaint returned in *January* worse than before. He is now much better, but I have great reason to believe the liver to be diseased.

I am, with the greatest respect,
Your very obliged humble servant,
DANIEL BODEN.

P.S. The second patient, on his relapse, took Digitalis again, combined with other things.

CASE *communicated by Mr.* CAUSER, *Surgeon, at Stourbridge, Worcestershire.*

Mr. P———, of H—— M——, in the parish of Kingswinford, aged about 60; had been a strong, healthy, robust, corpulent man; worked hard early in life at edge-tool making, and drank freely of strong malt liquor; for many years had been subject to gout in the extremities; for a few years past had been very asthmatic, and the gout in the extremities gradually decreased. When I first saw him, which was *September* 12, 1779, his legs were anasarcous, his belly much swelled, and an evident fluctuation of water. His breathing very bad, an irregular pulse, and unable to lie down. His easiest posture was standing with his body leaning over a chair, in which situation he would continue many hours together, labouring for breath, with the sweat trickling down his face very profusely; the urine in very small quantity. Diuretics of every kind I could think of were used with very little or no advantage. Blisters applied to the legs relieved very considerably for a time, but by no means could I increase the urinary discharge. Warm stomachic medicines were given, and, at the same time, sinapisms applied to the feet, in hopes of enticing gout to the extremities, but without any good effect.—*November* 22d. The swelling considerably increasing, an emetic of acet. scillitic. was given, which acted very violently, and increased the urinary discharge considerably. He continued better and worse, using different kinds of diuretic and expectorating medicines, until *September*, 1781, when the disease was so much worse I did not expect he could live many days. The acet. scillitic. was repeated, a table-spoonful every half hour, till it acted briskly upwards and downwards, but without increasing the urinary discharge.—On the 17th of *September*, I infused ʒiii. of the Fol. Digitalis in ℥vi. of boiling water, for four hours; then strained it, and added ℥i. of tinct. aromatica.—On the 18th, he began by taking one spoonful; which he was to repeat every half hour, till it made him very sick, unless giddiness, loss of sight, or any other disagreeable effect took place. I had never given the medicine before, and had prepared him to expect the operation to be very severe. I saw him again on the 21st; he had taken the medicine regularly, till the whole quantity was consumed, without perceiving the least effect of any kind from it, and continued well till the evening of the following day, when a little sickness took place, which increased, but never so as to occasion either vomiting or purging, but a surprising discharge of urine. The saliva increased so as to run out of his mouth, and a watery discharge from his eyes; these discharges continued, with a continual sickness, till the swelling was totally gone, which happened in three or four days. He afterwards took steel and bitters, and continued very comfortably, without any return of his dropsy, until the 7th of *April*, 1782, when he was seized with an epidemic cough, which was very frequent with us at that time. His swellings now returned very rapidly, with the greatest difficulty in breathing, and he died in a few days. Blisters and expectorating medicines were used on this last return.

Extract of a Letter from Mr. CAUSER.

Mrs. S———, the subject of the following Case, was as ill as it is possible for woman to be and recover: from the inefficacy of the medicines used, I am convinced no medicine would have saved her but the Digitalis. I never saw so bad a case recovered; and it shows, that, in the most reduced state of body, the medicine, in small doses, will prove safe and efficacious.

N.B. The Digitalis, in pills, never occasioned the least sickness. She took two boxes of them.

CASE.—*January* 2d, 1785. Mrs. S———, of W———, near K———, aged 38, has been affected with dropsical swellings of her legs and thighs, about six weeks, which have gradually grown worse; has now great difficulty in breathing, which is much increased on moving; a very irregular, intermittent pulse, urine in very small quantity, and in the seventh month of her pregnancy: a woman of very delicate constitution, with tender lungs from her infancy, and very subject to long-continued coughs.

R. Pulv. scillæ gr. iii.
Jalap gr. x. syr. rosar. solut. tinct. senn. aa ʒii. aq. menth. v. simpl. ℥iss. m. mane sumend.

R. Pulv. scillæ ℈i. G. ammoniac. sapon. venet. aa ʒiss. syr. q. s. f. pilul. 42 cap. iii. nocte maneque.

On the 7th, found her worse, and the swelling increased; the urine about ℥x in the twenty-four hours.

R. Fol. siccat. Digital. ʒiii. coque in. aq. fontan. ℥xii. ad ℥vi. cola et adde. aq. juniper. comp. ℥ii. sacchar. alb. ℥ss. m. cap. cochlear. i. larg. 4tis horis.

She took about three parts of the medicine before any effect took place. The first was sickness, succeeded by a considerable discharge of urine. She continued the medicine till the whole was consumed, which caused a good deal of sickness for three or four days.

I saw her again on the 12th. The quantity of urine was much increased, and the swelling diminished. Pulse and breathing better.

R. Fol. sicc. Digital. G. asafetid. aa ʒi. calomel. pp. gr. x. sp. lavend. comp. q. s. fiat pilul. xxxii. cap. ii. omni nocte horâ somni.

A plentiful discharge of urine attended the use of these pills, and she got perfectly free from her dropsical complaints.

March 15th she was delivered: had a good labour, was treated as is usual, except in not having her breasts drawn, not intending she should suckle her child, being in so reduced a state. Continued going on well till the 18th, when she was seized with very violent pains across her loins, at times so violent as to make her cry out as much as labour pains. Enema cathartic. Fot. papav. applied to the part.

R. Pulv. ipecacuan. gr. vi. opii. gr. iv. syr. q. s. fiat pilul. vi. capt. i. 2da quaque horâ durante dolore.

R. Julep. e camphor. sp. minder. aa ℥ii. capt. cochlear. i. larg. post singul. pilul.

19th. Breathing short, unable to lie down, very irregular low pulse scarcely to be felt, fainty, and a universal cold sweat: no appetite, nor thirst, spasmodic pains at times across the loins very violent, but not so frequent as on the preceding day.

R. Gum ammoniac. asafetid. aa ʒi. camphor. gr. xii. fiat pilul. 24 capt. ii. 3tia quaque horâ in cochlear. ii. mixtur. seq.

R. Balsam. peruv. ʒiii. mucilag. G. arab. q. s. flor. zinci g. vi. aq. menth. simp. ℔ss. m.
Applic. Emp. vesicat. femorib. internis.

R. Sp. vol. fœtid. elixir. paregor. balsam. Traumatic. aa ʒiii. capt. cochlear. parv. urgente languore.

20th. Much the same; makes very little water, and the legs begin to swell.—Applic. Emp. e pice burgund. lumbis.

23d. The swelling very much increased.—Capt. gutt. xv. acet. scillitic. ter die, in two spoonfuls of the following mixture.

R. Infus. baccar. juniper. ℥vi. tinct. amar. tinct. stomachic. aa ℥i. m.

25th. Much the same.

28th. The swelling considerably increased; in other respects very much the same.

30th. Breathing very bad, with cough and pain across the sternum, unable to lie down, legs, thighs, and body very much swelled, urine not more than four or five ounces in the twenty-four hours; hot and feverish, with thirst.—Applic. Emp. vesicat. stomacho et sterno.

R. G. asafetid. ℈ii. pulv. jacob. ℈i. rad. scill. recent. gr. xii. extract. thebaic. gr. iv. f. pilul. xvi. cap. iv. omni nocte.

R. Sal. nitr. sal. diuretic. aa ʒii. pulv. e contrayerv. comp. ʒi. sacchar. ℥i. emuls. commun. ℔i. aq. cinnam. simpl. ℥i. m. capt. cochlear iv. ter die.

April 2d. Much the same, no increase of urine.

3d. Breathing much relieved by the blister, which runs profusely. Repeated the medicines, and continued them till the

12th. The cough very bad, pulse irregular, swelling much increased, urine in very small quantity, not at all increased; great lowness and fainting. She desired to have some of the pills which relieved her so much when with child. I was almost afraid to give them, but the inefficacy of the other medicines gave me no hopes of a cure from continuing them, which made me venture to comply with her request.

> R. Fol. siccat. Digital. G. asafetid. aa ʒi. sp. lavend. comp. q. s. f. pilul. xxxii. cap. ii. omni mane; et omni nocte cap. pilul. e styrace gr. vi.

17th. Considerable increase of urine.

21st. Swelling a good deal diminished; urine near four pints in twenty-four hours, which is more than double the quantity she drinks.—Applic. Emp. vesicat. femoribus internis.

The Digitalis pills and opiate at bed-time continued. Takes a tea cup of cold chamomile tea every morning.

25th. Swelling much diminished, makes plenty of water, appetite much mended, cough and breathing better. She omitted the medicine for three days; the urine began to diminish, the swelling and shortness of breathing worse. On repeating it for two days, the discharge was again augmented, and a diminution of the swelling succeeded. She has continued the pills ever since till the 14th of *May;* the dropsical symptoms and cough are entirely gone, the water is in sufficient quantity, her strength is recovered, and she has a good appetite. All she now complains of is a weight across her stomach, which is worse at times, and she thinks, unless it can be removed, she shall have a return of her dropsy.

Extract of a Letter from Dr. Fowler, *Physician, at Stafford.*

I understand you are going to publish on the Digitalis, which I am glad to hear, for I have long wished to see your ideas in print about it, and I know of no one (from the great attention you have paid to the subject) qualified to treat on it but yourself. There are gentlemen of the faculty who give verbal directions to poor patients, for the preparing and taking of an infusion or decoction of the green plant. Would one suppose that such gentlemen had ever attended to the nature and operation of a sedative power on the functions, *particularly* the *vital?* Is not such a vague and unscientific mode of proceeding putting a two-edged sword into the hands of the ignorant, and the most likely method to damn the reputation of any very active and powerful medicine? And is it not more than probable that the *neglect* of adhering to a *certain* and *regular* preparation of the nicotiana, and the *want* of (what you *emphatically* call) a *practicable* dose, have been the chief causes of the once rising reputation of that noted plant being damned above a century ago? In short, the Digitalis is beginning to be used in dropsies, (although some patients are said to go off suddenly under its administration,) somewhat in the style of broom ashes; and, in my humble opinion, the public, at this very instant, stand in great need of your *precepts*, *guards*, and *cautions* towards the safe and successful use of such a powerful sedative diuretic; and I have no doubt of your minute attention to those particulars, from a regard to the good and welfare of mankind, as well as to your own reputation with respect to that medicine.

I remember an officer in the Staffordshire militia, who died here of a dropsy five years ago. The Digitalis relieved him a number of times in a wonderful manner, so that in all probability he might have obtained a radical cure, if he would have refrained from hard drinking. I understood it was first ordered for him by a medical gentleman, and its sedative effects proved so mild, and diuretic operation so powerful, that he used to prepare it afterwards for himself, and would take it with as little ceremony as he would his tea. It is said, that he was so certain of its successful operation, that he would boast to his bacchanalian companions, when much swelled, you shall see me in two days' time quite another man.

CASES *communicated by Mr.* J. FREER, *Jun. Surgeon, in Birmingham.*

CASE I.—*Nov.* 1780. Mary T———, aged 60, had been subject to asthma for several years; after a severe fit of it, her legs began to swell, and the quantity of urine to diminish. In six weeks she was much troubled with the swellings in her thighs and abdomen, which decreased very little when she lay down: she made not quite a pint of water in the twenty-four hours. I ordered her to take two spoonfuls of the infusion of Foxglove every three hours. By the time she had taken eight doses her urine had increased to the quantity of two quarts in the day and night, but as she complained of nausea, and had once vomited, I ordered the use of the medicine to be suspended for two days. The nausea being then removed, she again had recourse to it, but at intervals of six hours. The urine continued to discharge freely, and in three weeks she was perfectly cured of her swellings.

CASE II.—*December*, 1782. A poor woman, who had been afflicted with an ague during the whole of her pregnancy, and for two months with dropsical swellings of the feet, legs, thighs, abdomen, and labia pudendi; was at the expiration of the seventh month taken in labour. On the day after her delivery the ague returned with so much violence as to endanger her life. As soon as the fit left her, I began to give her the red bark in substance, which had the desired effect of preventing another paroxysm. She continued to recover her health for a fortnight, but did not find any diminution in the swellings; her legs were now so large as to oblige her to keep constantly on the bed, and she made very little water. I ordered her the infusion of Foxglove three times a day, which, on the third day, produced a very copious discharge of urine, without any sickness; she continued the use of it for ten days, and was then able to walk. Having lost all her swellings, and no complaint remaining but weakness, the bark and steel completed the cure.

Extract of a Letter from Dr. JONES, *Physician, in Lichfield.*

ANXIOUS to procure authentic accounts from the patients to whom I gave the Foxglove, I have unavoidably been delayed in answering your last favour. However, I hope the delay will be made up by the efficacy of the plant being confirmed by the inquiry. Long cases are tedious and seldom read, and as seldom is it necessary to describe every symptom; for every case would be a history of dropsy. I shall therefore content myself with specifying the nature of the disease, and when the dropsy is attended with any other affection shall notice it.

Two years have scarcely elapsed since I first employed the Digitalis; and the success I have had has induced me to use it largely and frequently.

Case I.—Ann W———, 50 years of age, became a patient of the Dispensary on the 11th of *April*, 1783. She then complained of an enlargement of the abdomen, difficulty of breathing, particularly when lying, and costiveness. She passed small quantities of high-coloured urine; and had an evident fluctuation in the belly. Her legs were œdematous. Crystals of tartar, squills, &c. had no effect. The 13th of *June* she took two spoonfuls of a decoction of Foxglove, containing three drams of the dry leaves, in eight ounces, three times a day. Her urine soon increased, and in a few days she passed it freely, which continued, and her breath returned.

Case II.—Mr. ———, 45 years of age, had been long subject to dropsical swellings of the legs, and made little water. Two spoonfuls of the same decoction twice a day, soon relieved him.

Case III.—Mrs. ———, aged 70 years. A lady frequently afflicted with the gout, and an asthmatical cough. After a long continuance of the latter, she had a great diminution of urine, and considerable difficulty of breathing, particularly on motion, or when lying. Her body was much bound. There was, however, no apparent swelling. She took three spoonfuls of an aperient decoction of forty five grains in six ounces and a half, every other morning. The urine was plentiful those days, and her breathing much relieved. In two or three weeks after the use of it she was perfectly restored. The purgative medicine neither increased the urine, nor relieved the breathing, till the Foxglove was added.

This spring she long laboured with the gout in her stomach, which terminated in a fit in her hand. During the whole of this tedious illness, of nearly three months, she passed little urine, and her breathing was again short.

She took the same preparation of Foxglove without any diuretic effect, and afterwards two and three grains of the powder twice a day with as little. The dulcified spirits of vitriol, however, quickly promoted the urinary secretion.

Case IV.—Mr. C———, 46 years of age, had dropsical swellings of the legs, and passed little urine. He took the decoction with three drams, and was soon relieved.

Case V.—Lady ———, took three grains of the dried leaves twice a day, for swelled legs, and scantiness of urine, without effect.

Case VI.—Mrs. S———, aged 36 years. For dropsy of the belly and legs, and scantiness of urine, of several weeks standing, took three grains of the powder twice a day, and was quite restored in ten days. She took many medicines without effect.

Case VII.—Mrs. P———, in her 70th year, took three grains of the powder twice a day, for scantiness of urine, and swelled legs, without effect.

Case VIII.—Ann W———, in her 26th year, had dropsical swellings of the legs, and passed little urine; she was relieved by two drams, in an eight ounce decoction.

Case IX.—William B———, aged 76, in the last stage of dropsy of the belly and legs, found a considerable increase of his urine by a decoction of Foxglove, but it was not permanent.

Case X.—Mr. ———, — years of age, and of very gross habit of body, became highly dropsical, and took various medicines, without effect. One ounce of the decoction, with three drams of the dry leaves in eight ounces, twice or three times a day, increased his urine prodigiously. He was evidently better, but a little attendant nausea overcame his resolution, and in the course of some weeks afterwards he fell a victim to his obstinacy.

Case XI.—Mrs. S———, about 50 years of age, after a tedious illness of many weeks, had a jaundice, and became dropsical in the legs. Two spoonfuls of the decoction, with three drams twice a day, increased her urine, and abated the swelling.

Case XII.—Widow C———, about 60 years of age. Took the decoction in the same way for dropsy of the legs, with little effect.

Case XIII. ——— G———, about 34 years of age, was delivered of three children, and became dropsical of the abdomen. She passed little or no urine, had constant thirst, and no appetite. She took two spoonfuls of an eight-ounce decoction, with three drams twice a day. By the time she had finished the bottle, (which must have been on the fourth day,) she had evacuated all her water, and could go about. Her appetite increased with every dose, and she recovered without farther help.

Case XIV.—Miss M——— M———, in her 20th year. Had been infirm from her cradle, and, after various sufferings, had an astonishing œdematous swelling of one leg and thigh, of many weeks standing. She passed little or no urine, and had all her other complaints. She took two spoonfuls of an eight-ounce decoction, of two drams, twice a day. Her urine immediately increased; and, on the third day, the swelling had entirely subsided.

Case XV.—Mr. P———, 65 years of age, and of a full habit of body, had lived freely in his youth, and for many years led rather an inactive life. His health was much impaired several months, and he had a considerable distention, and evident fluctuation in the abdomen, and a very great œdema of the legs and thighs. His breathing was very short, and rather laborious, appetite bad, and thirst considerable. His belly was bound, and he passed very small quantities of high-coloured urine, that deposited a reddish matter. He had taken medicines some time, and, I believe, the Digitalis, and had been better.

A blister was applied to the upper and inside of each thigh; he took two spoonfuls of the decoction, with three drams of the dry leaves, two or three times a day; and some opening physic occasionally.

He lived at a considerable distance, and I did not visit him a second time; but I was well informed, about ten days or a fortnight afterwards, that his urine increased amazingly upon taking the decoction, and that the water was entirely evacuated.

Case XVI.—Mrs. G———, aged 50 years, after being long ailing, had a large collection of water in the abdomen and lower extremities. Her urine was high-coloured, in small quantities, and had a reddish sediment. She took the decoction of Digitalis, squills, &c. without any effect. The crystals of tartar, however, cured her speedily.

Case XVII.—Mr. ———, about 50 years of age, complained of great tension and pain across the abdomen, and of loss of appetite; his urine, he thought, was less than usual, but the difference was so trifling he could speak with no certainty; his belly seemed to fluctuate. Among other things he tried the Foxglove leaves dried, twice a day; and, although it appeared to afford him relief, yet the effect was not permanent.

Case XVIII.—Mr. W———, aged between 60 and 70 years, and rather corpulent; was considerably dropsical, both of the belly and legs, and his urine in small quantities. Three grains of the dry leaves, twice a day, evacuated the water in less than a fortnight.

Case XIX.—Sarah T———, 40 years of age, was admitted into the Dispensary for dropsy of the abdomen and legs; and was relieved by the Decoctum digitalianum.

Case XX.—Lydia S———, aged 60. Dispensary. Laboured many years under an asthma, and became dropsical. She took the decoction without effect.

Case XXI.—John L———, aged 15 years. Had a quotidian intermittent, which was removed by the humane assistance of an amiable young lady. His intermittent was soon attended by a very considerable ascites: for which he became a patient of the Dispensary. He took a decoction of Foxglove night and morning. His urine increased immediately, and he lost all his complaints in four days.

Case XXII.—Wm M———, aged 50 years. Admitted into the Dispensary for a tertian ague, and general dropsy. The dropsy continuing after the ague was removed, and his urine being still passed in small quantities; he took the powdered leaves, and recovered his health in five days.

Case XXIII.—Ann W———, 10 years of age, had for several weeks a dropsy of the belly after an ague. She took a decoction of Foxglove, which removed all complaint by the fourth day.

Case XXIV.—Ann M———, a Dispensary patient. Had an ascites and scantiness of urine.

She took the powder of Foxglove, and evacuated all her water in three days.

It may not be improper to observe, First, That various diuretics had long been given in many of these cases before I was consulted: and, Secondly, That the exhibition of the Foxglove was but seldom attended with sickness.

REMARKS.

These Cases, thus liberally communicated by my friend, Dr. Jones, are more acceptable, as they seem to contain a faithful abstract from his notes, both of the unsuccessful as well as the successful Cases.

The following Tabular View of them will give some idea of the efficacy of the medicine.

Anasarca	7 Cases	Cured	3
		Relieved	1
		Failed	3
Ascites	5 Cases	Cured	4
		Relieved	1
Œdematous leg	1 Case	Cured	1
Ascites and anasarca	7 Cases	Cured	4
		Relieved	2
		Failed	1
Asthma and dropsy	1 Case	Failed	1
Hydrothorax and gout	1 Case	Cured	1
————, ascites, and anasarca	2 Cases	Cured	2

A Case of Anasarca communicated by Mr. JONES, *Surgeon, in Birmingham.*

DEAR SIR,

Having lately experienced the diuretic powers of the Foxglove, in a case of anasarca, I do myself the pleasure of communicating a short history of the treatment to you.

I am, &c.
W. JONES.

Birmingham, May 17th, 1785.

My patient, Mrs. C——, who is in her 51st year, had the following symptoms, viz. alternate swelling of the legs and abdomen, a little cough, shortness of breath in a morning, thirst, weak pulse, and her urine, which was so small in quantity as seldom to amount to half a pint in twenty-four hours, deposited a clay-coloured sediment.

April 16th, 1785, I directed the following form:

R. Fol. Digitalis siccat. ʒii.
Aq. fontanæ bullient. ℥viii. f. infus. et cola.
Sumat cochl. larga iii. o. n. et mane.

On the 17th she had taken twice of the infusion, and though by mistake only two tea-spoonfuls, for a dose, yet the quantity of urine was increased to about a pint in the twenty-four hours. She was then directed to take two table spoonfuls night and morning. And,

On the 18th, a degree of nausea was produced. A pint and a half of urine was made in the last twenty-four hours. During the time above specified she had two or three stools every day. The infusion was now omitted.

On the 19th, the swelling of the legs was removed. A degree of nausea took place in the morning, and increased so much during the day, that she vomited up all her food and medicine. As she was very low and complained of want of appetite, a cordial julep was directed to be taken occasionally, as well as red port and water, mint tea, &c. She informed me that whatever she took generally staid about an hour before it came up again, and that the mint tea staid longest on the stomach. The vomiting decreased gradually, and ceased on the 22d. The discharge of urine remained considerable during the three following days, but its quantity was not measured.

22d. A dose of neutral saline julep was directed to be taken every fourth hour.

On the 23d she complained of thirst, and thought the discharge of urine not so copious as on the preceding days: therefore, the saline julep was continued every fourth hour, with the addition of thirty drops of the following medicine:—

R. Aceti scillitic. ʒvi.
Tinct. aromat. ʒii.
Tinct. thebaic. gutt. xx. m.

The bowels have been kept open from the 19th, by the occasional use of emollient injections.

On the 24th, the legs were much swelled again; she complained of languor and a degree of nausea. The discharge of urine increased a little since the 23d. Her pulse was low, and her tongue white. The urine, which had been rendered clear by the infusion of Foxglove, now deposited a whitish sediment.

On the 25th her appetite began to return, the swelling of the legs diminished, and she thought herself much relieved. The urine was considerable in quantity, and clear.

On the 26th she was thirsty and languid. The swelling was removed; the quantity of urine discharged in the last twenty-four hours was about a pint. She continued to mend from this time, and is now in good health.

A giddiness of the head, more or less remarkable at times, was observed to follow the use of the Foxglove, and it lasted nine or ten days.

This is the second time that I have relieved this patient by the infusion of Foxglove. I used the same proportion of the fresh leaves the first time as I did of the dried ones the last. The violent vomiting, which followed the use of the infusion made with the dried leaves, did not take place with the fresh, though she took near a pint made with the same proportion of the herb fresh gathered.

REMARKS.

The above is a very instructive case, as it teaches us how small a quantity of the infusion was necessary to effect every desirable purpose. At first sight, it may appear from the concluding paragraph that the green leaves ought to be preferred to the dried ones, as being so much milder in their operation; but let it be noticed, that the same quantity of infusion was prepared from the same weight of the green as of the dried leaves; and, consequently, as will appear hereafter, the infusion with the dried leaves was five times the strength of that before prepared from the green ones. We need not wonder, therefore, that the effects of the former were so disagreeable, when the dose was five times greater than it ought to have been. But what makes this matter still more obvious, is the mistake mentioned at first of two tea spoonfuls only being given for a dose: now a tea spoonful, containing about a fourth or a fifth part of the contents of a table spoon, the dose then given was very nearly the same as that which had before been taken of the infusion of the green leaves, and it produced precisely the same effects, for it increased the urinary discharge, without exciting the violent vomiting.

Letter from Dr. JOHNSTONE, *Physician, in Birmingham.*

DEAR SIR,

The following cases are selected from many others in which I have given the Digitalis purpurea; and from repeated experience of its efficacy, after other diuretics have failed, I can recommend it as an effectual, and, when properly managed, a safe medicine.

I am, &c.

E. Johnstone.

Birmingham, May 26, 1785.

March 8th, 1783. I was called to attend Mr. G——, a gentleman of a robust habit, who had led a regular and temperate life, æt. 68. He was affected with great difficulty of respiration, and cough particularly troublesome on attempting to lie down, œdematous swellings of the legs and thighs, abdomen tense and sore on being pressed, pain striking from the pit of the stomach to the back and shoulders; almost constant nausea, especially after taking food, which he frequently threw up; water thick and high-coloured, passed with difficulty, and in small quantity; body costive; pulse natural; face much emaciated, eyes yellow and depressed. He had been subject to cough and difficulty of breathing in the winter for several years; and, about four years before this time, after being exposed to cold, was suddenly deprived of his speech, and the use of the right side, which he recovered as the warm weather came on; but since that time had been remarkably costive, and was in every respect much debilitated. He first perceived his legs swell about a year ago; by the use of medicines and exercise, the swellings subsided during the summer, but returned on the approach of winter, and gradually increased to the state in which I found them, notwithstanding he had used different preparations of squills and a great variety of other diuretic medicines. I ordered the following mixture :—

R. Foliorum Digitalis purpur. recent. ʒiii. decoque ex aq. fontan. ℥xii. ad ℥vi. colaturæ adde Tinctur. aromatic.
Syr. zinzib. aa. ℥i. m. capt. cochl. duo larga secunda quaque hora ad quartam vicem nisi prius nausea supervenerit.

March 9th. He took four doses of the mixture without being in the least sick, and made, during the night, upwards of two quarts of natural coloured water.

10th. Took the remainder of the mixture yesterday afternoon and evening, and was sick for a short time, but made nearly the same quantity of water as before, the swellings are considerably diminished, his appetite increased, but he is still costive.

R. Argent. viv. balsam peruv. aa. ʒss. tere ad extinctionem merc. et adde gum. ammon. ℈iii. aloes socotorin. ʒss. rad. scil. recent. ℈ss. syr. simpl. q. s. f. mass. in pil. xxxii. divid. cap. iii. bis in die.

14th. Continues to make water freely. The swellings of his legs have gradually decreased; soreness and tension of the abdomen considerably less.

Omittant. pil. cap. mistur. c. decoct. Digitalis, &c. 3tia quaque hora ad 3tiam vicem.

15th. Made a pint and a half of water last night, without being in the least sick, and is in every respect considerably better.—Repet. pillul. ut antea.

21st. Makes water as usual when in health, and the swellings are entirely gone.

> R. Infus. amar. ℥v. tinctur. Rhei spirit. ℥ii. spirit vitriol. dulc. ʒii. syr. zinzib. ʒvi. m. cap. cochl. iii. larg. ter. in die.

He soon gained sufficient strength to enable him to go a journey, and returned home in much better health than he had been from the time he was affected with the paralytic stroke, and excepting some return of his asthmatic complaint in the winter, hath continued so ever since.

Case II.—R. H———, a man much addicted to intemperance, particularly in the use of spirituous liquors, æt. 60, was admitted into the Hospital near Birmingham, *May* 17, 1783. He complained of difficulty of breathing, attended with cough, particularly troublesome on lying down; drowsiness and frequent dozing, from which he was roused by startings, accompanied with great anxiety and oppression about the breast; œdematous swellings of the legs; constant desire to make water, which he passed with difficulty, and only by drops; pulse weak and irregular; body rather costive; face much emaciated; no appetite for food.—Cap. pil. scil. iii. ter in die.*

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* R. Rad. scil. recent. sapon. castiliens. pulv. Rhei opt. aa.

May 20th. The pills have had no effect.—Cap. mistur. c.* Decoct. Digital. &c. cochl. ii. larg. 3tia quaque hora, ad 3tiam vicem.

May 21st. Made near two quarts of water in the night, without being in the least sick. He continued the use of the mixture three times in the day till the 30th, and made about three pints of water daily, by which means the swellings were entirely taken away; and his other complaints so much relieved, that on the 6th of *June* he was dismissed free from complaint, except a slight cough. But returning to his old course of life, he hath had frequent attacks of his disorder, which have been always removed by using the Digitalis.

Extract of a Letter from Mr. Lyon, *Surgeon, at Tamworth.*

Mr. M——— was about 54 years of age, his disease a dropsy of the abdomen, attended with anasarcous swellings of the limbs, &c. brought on by excessive drinking. I believe the first symptoms of the disease appeared the beginning of *November*, 1776; the medicines he took before you saw him, were squills in different forms, sal

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℈i. ol. junip. gutt. xvi. syr. bals. q. s. f. mass. in pil. xxiv. divid.

* Prepared in the same manner as in the former case.

diureticus, and calomel, but without any good effect; he began the Digitalis on the 10th of *July*, 1777; a few doses of it caused a giddiness in the head, and almost deprived him of sight, with very great nausea, but very little vomiting, after which a considerable flow of urine ensued, and in a very short time, a very little water remained either in the cavity of the abdomen, or the membrana adiposa, but he remained excessive weak, with a fluttering pulse at the rate of 150 or frequently 160 in a minute; he kept pretty free from water for upwards of twelve months; it then collected, and neither the Digitalis nor any other medicine would carry it off. I tapped him the 2d of *August*, 1779, in the usual place, and took some gallons of water from him, but he very soon filled again, and as he had a very large rupture, a considerable quantity of the water lodged in the scrotum, and could not be got away by tapping in the usual place. I therefore (on the 28th of the same month) made an incision into the lower part of the scrotum, and drained off all the water that way, but he was so very much reduced, that he died the 8th or 9th of *September* following, which was about two years and two months after he first began the Digitalis.

I have had several dropsical patients relieved, and some perfectly recovered by the Digitalis, since you attended Mr. M——, but as I did not take any notes or make any memorandums of them, cannot give you any of them.

Communications from Dr. STOKES, *Physician, in Stourbridge.*

DEAR SIR,

I ACCEPT with pleasure your invitation to communicate what I know respecting the properties of *Digitalis;* and if an account of what others had discovered before you,* with a detail of my own experience, shall be allowed the merit of at least a well meant acknowledgement, for the early communication you were so kind to make me, of the valuable properties you had found in it, I shall consider my time as well employed. A knowledge of what has been already done is the best ground-work of future experiment; on which account I have been the more full on this subject, in hopes that given with the cautions which you mean to lay down in the cure of dropsies, it may prove alike useful in that of other diseases, one of which stands foremost among the *opprobria* of medicine.

CASE I. — Mrs. M———. Orthopnœa, pain and excessive oppression at the bottom of the sternum. Pulse irregular, with frequent intermissions. Appetite very much impaired. Legs anasarcous.

Empl. vesicator. pectori dolent.

Infus. Digital. e ʒiii. ad aq. &c. ℥viii. cochl. j. o. h. donec nausea excitetur vel diuresis satis copiosa proveniat.

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* See this account in the Introduction.

I ordered it of the above strength, and to be repeated often, on account of the great emergency of the case; but the nausea excited by the first dose prevented its being given at such short intervals. A third dose I found had been given, which was followed by vomitings. All her complaints gradually abated, but in about a fortnight recurred, notwithstanding the use of infus. amar. &c.

Dec. 2. Infus. Digit. e. ʒiss ad aq. &c. ℥viii. cochl. ii. horis, &c. u. a.

Complaints gradually abated, swellings of the legs nearly gone down.

About a month afterwards you was desired to visit this patient.*

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* For reasons assigned at p. 211, I did not intend to introduce any case, occurring under my own inspection, in the course of the present year; but it may be satisfactory to continue the history of this disease, as Dr. Stokes's narrative would otherwise be incomplete.

1785.

Case.—*January* 5th. Mrs. M———, æt. 48. Hydrothorax and anasarcous legs, of eight months' duration. She had taken jalap, squill, salt of tartar, and various other medicines. I found her in a very reduced state, and therefore directed only a grain and a half of the Pulv. Digital. to be given night and morning. This in a few days increased the secretion of urine, removed her difficulty of breathing, and reduced the swelling of her legs, without any disturbance to her system.

Three months afterwards, a severe attack of gout in her legs and arms removing to her head she died.

Dr. Stokes had an opportunity of examining the dead body, and I had the satisfaction to learn from him, that there did not appear to have been any return of the dropsy.

On the examination of the body I noticed, among others, the following appearances.

About three-quarters of an ounce of bloody water flowed out, on elevating the upper half of the scull, and a small quantity also was found at the base.

BRAIN. Blood-vessels turgid with blood, and many of those of considerable size distended with air.

A very slight watery effusion between the *Pia Mater* and *Tunica arachnoidea.* About three-quarters of an ounce of watery fluid in the *lateral ventricles.*

THORAX. In the left cavity about four ounces of bloody serum; in the right but little. Lungs, the hinder parts loaded with blood. Adhesions of each lobe to the pleura. *Pericardium* containing but a very small quantity of fluid. *Heart* containing no coagula of blood. *Valves of the Aorta* of a cartilaginous texture, as if beginning to ossify.

Abdominal Viscera natural, and a profusion of *Fat* under the integuments of the abdomen and thorax, in the former to the thickness of an inch and upwards, and in very considerable quantity on the mesentery, omentum, kidneys, &c.

OBSERVATION. The intermitting pulse should seem to have been owing to effusions of water in some of the cavities of the breast, as it disappeared on the removal of the waters.

CASE II.—Mrs. C———, of K———, æt. 80. Orthopnœa, with sense of oppression about the præcordia. Unable to lie down in bed for some nights past. Anasarca of the lower extremities. Urine very scanty. Complaints of six weeks standing. Had taken *sal. diuret. c. ol. junip.*—*Calom. c. jalap, et gambog.*—*Et ol. junip. c. ol. Terebinth.* without effect.

February 7. *Infus. Digital. e. ʒiii. ad aq. &c. ℥viii. cochl. ii. 4tis horis.* Ordered to drink largely of *infus. baccar. junip.* The third dose produced great nausea which continued ten hours, during which time the urine made was about a quart. The next day her apothecary directed her to begin again with it. The second dose produced vomiting. During the next twenty hours she made two quarts of water, about four times as much as she drank.

From this time she took no more of the *infus. Digital.* but continued the *inf. bacc. junip.* until about *March* 2d, when all the swellings were gone down, her respiration perfectly free, and she herself quite restored to her former state of health. On the 29th she had an attack of jaundice which was some time after removed; since which she has enjoyed a good state of health, excepting that for some little time past her ancles have been slightly œdematous, which will I trust soon yield to strengthening medicines.

Case III.—Mrs. M——— G———, æt. 64. Has had sore legs for these thirty-four years past. Orthopnœa. Sense of oppression at the præcordia. Pulse intermitting. Legs anasarcous. Urine scanty, high-coloured.

Infus. Digital. c. ʒiss ad aq. bull. ℥viii. cochl. ii. 4tis horis.

Took six doses, when nausea was excited. Urine a quart during the course of the night. The flow of urine continued, and complaints relieved. Sal. Mart. c. extr. gent. and afterwards with the addition of extr. cort. for which last ingredient she had a predilection, confirmed the cure.

On the same day the next year I was called in to her for a similar train of symptoms, excepting that the pulse was but just perceptibly irregular.

Infus. Digital. u. a. præscript.

The directions on the phial not being attended to, *two doses of it were given after a nausea had been excited*, which, with occasional vomitings, became exceedingly oppressive. A saline draught, given in Dr. Hulme's method, a draught *sal. c. c. gr. xii. c. conf. card. gr. x.* produced no immediate effect, but the nausea gradually abating, inf. bacc. junip. was ordered; but this appeared to augment it, and a great propensity to sleep coming on, I directed *sal. c. c. conf. card. aa gr. viii. 4tis horis,* which removed the unpleasant symptoms, and *myrrh. c. sal. mart.* completed the cure. During the use of the above medicines, the urine was augmented, and the pulmonary complaints removed, even before the nausea left her; and the sores of her legs which were much inflamed before she began with the infus. Digital. in a day's time assumed a much healthier appearance, and on her other complaints going off, they showed a greater tendency to heal than she had ever observed in them for twenty years before. This instance is a very pleasing confirmation of the experience of Hulse and Dr. Baylies, and of the advantage to be derived from a medicine, which, while it helps to heal the ulcers, removes that from the constitution which often renders the healing of them improper.

In one case in which I ordered it, the infusion, instead of digesting three hours as I had directed, was suffered to stand upon the leaves all night. The consequence was that the first dose produced considerable nausea.

The two following cases, with which I have been favoured by a physician very justly eminent, convince me of the necessity that every one who discovers a new medicine, or new virtues in an old one, should, in announcing such discoveries, publish to the world the exact manner in which he exhibits such medicines, with all the precautions necessary to obtain the promised success.

In these (says my correspondent) " the infusion was given in small doses, repeated every hour or two, till a nausea was raised, when it was omitted for a day, or perhaps two, and then repeated in the same manner.

" An Ascites emptied by it, but filled again very speedily, though *its use was never discontinued*, and who afterwards found no salutary effects from it. Ended fatally.

" In an Anasarca it sometimes increased the quantity of urine, and abated the swelling, but which as often returned in as great a degree as before, though *the medicine was still given*, and always increased in quantity so as to excite nausea. Ended fatally.

" I have tried it in many other cases, but found very little difference in the success attending it."

May we not be allowed to conjecture that the inefficacy of *its continued use* is owing to its narcotic property gradually diminishing the irritability of the muscular fibres of the absorbents, or possibly of the whole vascular system, and thus adding to that weakened action which seems to be the cause of the generality of dropsies, which leads us to caution the medical experimenter against trying it, at least *against its continued use, even in small doses*, in other diseases of diminished energy, as continued fever, palsy, &c.?

I remain with the greatest truth,
Your obliged and affectionate friend,
JONATHAN STOKES.

Stourbridge, May 17, 1785.

The three following Hospital Cases, which Dr. STOKES *had an opportunity of observing, are related as instances of bad practice, and tend to demonstrate how necessary it is when one physician adopts the medicine of another, that he should also at first rigidly adopt his method.*

Case I.—Esther K———, æt. 33. General anasarca, ascites, and dyspnœa, of seven months' duration.

Decoct. e Digit. ʒiv. c. aq. ℔i. coquend. ad ℔ss. cap. ℥i. 2dis. horis. 1st day. 4th dose made her sick.

2d. The first dose she took to-day produced vomiting.

3d. *Minuatur dosis ad ℥ss.* This staid on her stomach, but produced an almost constant sickness. Stools more frequent, water scarce sensibly increased; and her swellings not at all reduced.

4th. *Cap. Calomel. gambog. scill. &c.*

Observations. Sufficient time was not allowed to observe its effects, neither was the patient enjoined the free use of diluents. The disease terminated fatally.

Case II.—William T———, æt. 42. Ascites, with cough and dyspnœa. Abdomen very much distended. The rest of his body highly emaciated. Urine thick, high coloured, and in very small quantity.

Decoct. Digit. (u. in Esther K———,) 4tis horis.

1st day of taking it. The 4th dose produced sickness.

2d. Vomiting after the second dose.

10th. Urine increased to ℔vi.

11th. Flow of urine continues. Abdomen quite flaccid.

12th. Abdomen not diminished.

15th. A smart purging came on, and the flow of urine diminished.

23d. Belly much bound. Took a cathart. powder, which was followed by a diminution of the abdomen.

29th. To take a cathart. powder every fourth morning, continuing the decoct. Digit.

32d. Urine exceedingly scanty.

35th. *Vin. scill. ℥ss. o. m. &c.* This produced diuretic effects.

44th. Tapped. Terminated fatally.

OBSERVATION. Here the medicine was *continued till it ceased to produce diuretic effects*; and these effects were not aided by any strengthening remedies.

CASE III.—George R———, æt. 52. Ascites, general anasarca, and dyspnœa. His legs so greatly distended that it was with great difficulty he could draw the one after the other.

Infus. Digital. ʒiiiss. ad aq. ℔ss. cap. ℥i. altern. horis donec nauseam excitaverit. Rep. 3tiis diebus, tempore intermedio cap. sol. guaiac. ℥i. ter. in die ex inf. sinap.

1st day of taking it. Became sickish towards night.

2d. Made a great quantity of water during the night, and spat up a great deal of watery phlegm. The first dose he took in the morning has produced a sickness which has continued all day, but he has never vomited.

3d. The change in his appearance so great as to make it difficult to conceive him to be the same person. Instead of a large corpulent man, he appeared tall, thin, and rather aged. Breathes freely, and can walk up and down stairs without inconvenience.

4th. *Decoct. bacc. junip. and cyder for common drink.*

6th. A second course of his medicine produced a flow of urine almost as plentiful as the former, though he drank little or nothing at the time. In a day or two after he walked to some distance.

12th. *Pot. purgans illico.*

14th. *Pot. purg. c. jalap.* ʒ*ss. 4tis diebus.*
Infus. Dig. 3tiis diebus.

17th. *R. Gamb. gr. iii. calom. gr. ii. camph. gr. i. syr. simpl. fiat pil. o. n. sum.*
Infus. Digit. 3tiis diebus.

21st. Made an out-patient. The superabundant flow of urine continued for the first three days after his last course; but since, the flow of saliva has been nearly equal to that of urine.

The smalls of his legs not quite reduced, and are fuller at night. He has shrunk round the middle from four feet two inches to three feet six inches; and in the calves of his legs from seventeen inches to thirteen and a half.*

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* In the three last-recited cases, the medicine was directed in doses quite too strong, and repeated too frequently. If Esther K—— could have survived the extreme sickness, the diuretic effects would probably have taken place, and, from her time of life, I should have expected a recovery. Wm.

Observation. The waters were here very successfully evacuated; but, as you remarked to me on communicating the case to you at the time, tonic medicines should have been given, to second the ground that had been gained, instead of weakening the patient by drastic purgatives.

A Case from Mr. Shaw, *Surgeon, at Stourbridge. Communicated by Dr.* Stokes.

Mr. D———, æt. 71. Tall and thin. Disease a general anasarca, with great difficulty of breathing. The lac ammoniac. somewhat relieved his breath; but the swellings increased, and his urine was not augmented. I considered it as a lost case, but, having seen the good effects of the Digitalis, as ordered by Dr. Stokes in the case of Mrs. G———, I gave him one spoonful of an infusion of ʒii. to half a pint, twice a day. His breath became much easier, his urine increased considerably, and the swellings gradually disappeared; since which his health has been pretty good, except that, about three weeks ago, he had a slight dyspnœa, with pain in his stomach, which were soon removed by a repetition of the same medicine.

Mr. Shaw likewise informs me, that he has

T—— seems to have been a bad case, and I think would not have been cured under any management. G. R—— certainly possessed a good constitution, or he must have shared the fate of the other two.

removed pains in the stomach and bowels, by giving a spoonful of the infusion, ʒiss. to ℥viii. morning and night.

A Letter from Mr. Vaux, *Surgeon, in Birmingham.*

Dear Sir,

I send you the two following cases, wherein the Digitalis had very powerful and sensible effects in the cure of the different patients.

Case I.—Mrs. O———, of L——— street, in this town, aged 28, naturally of a thin, spare habit, and her family inclinable to phthisis, sent for me on the 11th of *June*, 1779, at which time she complained of great pain in her side, a constant cough, expectorated much, which sunk in water; had colliquative sweats and frequent purging stools; the lower extremities and belly full of water, and, from the great difficulty she had in breathing, I concluded there was water in the chest also. The quantity of water made at a time for three weeks before I saw her, never amounted to more than a tea-cup full, frequently not so much. Finding her in so alarming a situation, I gave it as my opinion she could receive no benefit from medicine, and requested her not to take any; but she being very desirous of my ordering her something, I complied, and sent her a box of gum pills with squills, and a mixture with salt of tartar; these medicines she took until the 16th, without any good effects: the water in her legs now began to exude through the skin, and a small blister on one of her legs broke. Believing she could not exist much longer, unless an evacuation of the water could be procured; after fully informing her of her situation, and the uncertainty of her surviving the use of the medicine, I ventured to propose her taking the Digitalis, which she cheerfully agreed to. I accordingly sent her a pint mixture, made as under, of the fresh leaves of the Digitalis. Three drams infused in one pint of boiling water, when cold strained off, without pressing the leaves, and two ounces of the strong juniper water added to it: of this mixture she was ordered four table spoonfuls every third hour, till it either made her sick, purged her, or had a sensible effect on the kidneys. This mixture was sent on the 17th, and she began taking it at noon on the 18th. At one o'clock the following morning I was called up, and informed she was dying. I immediately attended her, and was agreeably surprised to find their fright arose from her having fainted, in consequence of the sudden loss of twelve quarts of water she had made in about two hours. I immediately applied a roller round her belly, and, as soon as they could be made, two others, which were carried from the toes quite up the thighs. The relief afforded by these was immediate; but the medicine now began to affect her stomach so much, that she kept nothing on it many minutes together. I ordered her to drink freely of beef tea, which she did, but kept it on her stomach but a very short time. A neutral draught in a state of effervescence was taken to no good purpose: she therefore continued the beef tea, and took no other medicine for five days, when her sickness went off: her cough abated, but the pain in her side still continuing, I applied a blister which had the desired effect: her urine after the first day flowed naturally. Her cure was completed by the gum pills with steel and the bitter infusion. It must be observed she never had any collection of water afterwards.

It affords me great pleasure to inform you that she is now living, and has since had four children; all of whom, I think I may justly say, are indebted to the Digitalis for their existence.

There appears in this case a striking proof of the utility of emetics in some kinds of consumptions, as it appears to me the dropsy was brought on by the cough, &c. and I believe these were cured by the continual vomitings, occasioned by the medicine.

Case II.—Mr. H———, a publican, aged about 48 years, sent for me in *March*, 1778. He complained of a cough and shortness of breathing, which prevented him from lying down in bed; his belly, thighs, and legs very much distended with water; the quantity of urine made at a time seldom exceeded a spoonful. I requested him to get some of the Digitalis, and as they had no proper weights in the house, I told them to put as much of the fresh leaves as would weigh down a guinea, into half a pint of boiling water; to let it stand till cold then to pour off the clear liquor, and add a glass of gin to it, and to take three table spoonfuls every third hour, until it had some sensible effect upon him.

Before he had taken all the infusion, the quantity of urine made increased, (he therefore left off taking it,) and it continued to do so until all the water was evacuated. His breathing became much better, his cough abated, though it never quite left him; he being for some time before asthmatic. By taking some tonic pills he continued quite well until the next spring, when he had a return of his complaint, which was carried off by the same means. Two years after, he had a third attack, and this also gave way to the medicine. Last year he died of a pleurisy.

I am, &c.

JER. VAUX.

Moor-Street, 8th May,
1785.

P.S. You must well recollect the case of Mrs. F———. It was "a general dropsy—every time she took the medicine its effects were similar, viz. the discharge of urine came on gradually at first, increased afterwards, and the whole of the water both in the belly, legs, &c. was perfectly evacuated. Although the effects were only temporary, they were exceedingly agreeable to the patient, making her time much more comfortable."—*(See Case* XLIII.)

A Letter from Mr. WAINWRIGHT, *Surgeon, in Dudley.*

DEAR SIR,

IT gives me great pleasure to find you intend to publish your observations on the Digitalis purpurea.

Several years are now elapsed since you communicated to me the high opinion you entertained of the diuretic qualities of this noble plant. To insure success, due attention was recommended to its *preparation,* its *dose,* and its *effects* upon the system.

I always gave the infusion of the dried leaves; the dose the same as in the prescriptions returned. If the medicine operated on the stomach or bowels, it was thought prudent to forbear. When the kidneys began to perform their proper functions, and the urine to be discharged, a continuance of its farther use was unnecessary.

These remarks you made in the case of the first patient for whom you prescribed the Digitalis in our neighbourhood, and I have found them all necessary at this present period. From the *decided* good effects that followed from its use, in those cases where the most powerful remedies had failed, I was soon convinced it was a most valuable addition to the materia medica.

The want of a certain diuretic has long been one of the desiderata of medicine. The Digitalis is undoubtedly at the head of that class, and will seldom, if properly administered, disappoint the expectation. I can speak with the more confidence, having, in an extensive practice, been a happy witness to its good qualities.

For several years, I have given the infusion in a variety of cases where there was a deficiency in the secretion of the urine with the greatest success. In recent obstructions, I do not recollect many failures. In anasarcous diseases, and in the anasarca, when combined with the ascites; in swellings of the limbs, and in diseases of the chest, when there was the greatest reason to believe an accumulation of serum, the most beneficial consequences have followed from its use.

Had I been earlier acquainted with your intention to publish an account of the Digitalis, I could have transmitted some cases, which might have served to corroborate these assertions: but I am convinced the Digitalis needs not my assistance to procure a favourable reception. Its own merit will insure success, more than a hundred recited cases.

I could wish those gentlemen who intend to make use of this plant, to collect it in a hot dry day, when the petals fall, and the seed-vessels begin to swell.

The leaves kept to the second year are weaker, and their diuretic qualities much diminished. It will therefore be *necessary to gather the plant fresh every season.*[*]

These cautions are unnecessary to the accurate botanist, who well knows, that a plant in the spring, though more succulent and full of juices, is destitute of those qualities which may be expected when that plant has attained its full vigour, and the seed-vessels begin to be manifest. But for want of attention to these particulars, its virtues may be thought exaggerated, or doubtful, if beneficial consequences do not always flow from its use. There are diseases it cannot cure; and in several of those patients in this town, who first took the Digitalis by your orders, there was the most positive proof of the viscera being unsound. In these desperate cases it often procured a plentiful flow of urine, and palliated a disease which medicine could not remove.

At a remote distance, physicians are seldom applied to for advice in trifling disorders. Many remedies have been tried without relief, and the disease is generally obstinate or confirmed. It would not be fair to try the merits of the Digitalis in this scale. It might often fail of promoting the end desired. I flatter myself the reputation of this plant will be equal to its merit, and that it will meet with a candid reception.

As there is no pleasure equal to relieving the miseries and distresses of our fellow-creatures, I hope you will long enjoy that peculiar felicity.

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[*] An important remark, which merits particular attention, and is scarcely sufficiently insisted upon in other parts of this treatise.—Ed.

Permit me to return my thankful acknowledgements for your free communication of a medicine, by which means, through the blessing of Providence, I have been enabled to restore health and happiness to many miserable objects.

I am, &c.
Yours,
J. WAINWRIGHT.

Dudley, April 26th, 1785.

Case of Mr. WARD, *Surgeon, in Birmingham. Related by himself.*

IN *September*, 1782, I was seized with a difficulty of breathing and oppression in my chest, in consequence of taking cold from being called out in the night. My tongue was foul; my urine small in quantity; my breath laborious and distressing on the slightest exercise. I tried the medicines most generally recommended, such as emetics, blisters, lac ammoniacum, oxymel of squills, &c. but finding little or no relief, I consulted Dr. Withering, who advised me to try the following prescription.

R. Fol. Digital. purp. siccat. ʒiss.
Aq. bullientis ℥iv.
Aq. cinn. sp. ℥ss. digere per horas quatuor, et colaturæ capiat cochlear. i. nocte maneque.

He also desired me to take fifty drops of tincture of cantharides three or four times a day.

After taking eight ounces of the infusion, and about twelve drams of the drops, I was perfectly cured, and have had no return since. The medicine did not occasion sickness or vertigo, nor had they any other sensible effect than in changing the appearance, and increasing the quantity of the urine, and rendering the tongue clean. After the last dose or two, indeed, I had a little nausea, which was immediately removed by a small glass of brandy.

Birmingham, 1st July, 1785.

Communications from Mr. YONGE, *Surgeon, in Shiffnal, Shropshire.*

DEAR SIR,

I HAVE great satisfaction in complying with your just claim, by transcribing outlines of the subsequent cases for insertion in your long-requested tract on the Digitalis purpurea. The two first of these you will easily recollect, the cures having been conducted immediately under your own management, and the whole may add to that weight of evidence which long experience enables you to adduce of the efficacy of that valuable medicine. I have recited the only instances of its failure which occur to me, but many other, though successful cases, wherein its utility might seem dubious, and also the accounts received from people whose accuracy might be suspected, I shall not, for obvious reasons, trouble you with.

I am, dear sir,
Your obliged friend,
William Yonge.

Shiffnal, May 1, 1785.

Case I.—A gentleman aged 49, on the night of the 21st of *August*, 1784, awoke with a sense of suffocation, which obliged him to rise up suddenly in bed. I found him complaining of difficult respiration, particularly on lying down; the countenance pale, and the pulse smaller and quicker than usual. Some brandy and water having been given, the symptoms gradually abated, so that he slept in a half-recumbent posture. The following day he expressed a sense of anxiety and weight in the chest, attended by quicker breathing upon motion of the body. That evening an emetic of ipecacuanha was given, and afterwards a draught, with vitriolic æther and confect. card. aa ʒi. to be repeated as the symptoms should require it. He continued to be affected with slighter returns of the dyspnœa at irregular intervals, until *September* 15th, when, upon a more severe attack, the emetic was repeated. He now recollected some slight pain in his arms which had affected him previous to this last seizure, and was disposed to consider his complaint as rheumatic. Pills with gum ammoniac. gum guaiac. and antimonial powder were directed, with infus. amar. simpl. twice a day.

The bowels were regulated by aperient pills of pulv. jalap. aloes, and sal. tartar. and ʒiss balsam peruv. was given occasionally to alleviate the paroxysms of dyspnœa.

From this period until the beginning of *November*, little amendment or variation happened, except that respiration became more permanently difficult, and particularly oppressed upon motion, nor was it relieved by the expectoration of a mucous discharge, which now increased considerably. Squills, musk, ol. succini, æther, with other medicines of the same kind, were now used, but without success. The effects of opium and venesection were tried. The appetite diminished, and his sleep became short and disturbed. He sometimes slept lying upon his back, but generally upon his left side. The urine, which had hitherto been of good colour, and sufficient quantity, now became diminished, and lateritious; and the ancles œdematous.

On the 15th of *November* a blister was laid over the sternum, and ʒiss of oxymel scillitic. was given every eight hours.

On the 18th a more copious discharge of urine took place; the swelling of the feet soon disappeared, and the respiration became gradually relieved.

On the 30th ʒi tinct. cantharidum twice a day in pyrmont water, with pills of ammoniac, sal tartar. et extract. gentian. were substituted, but

On the 7th of *December*, from some symptoms of relapse, the oxymel was used as before, and continued to be taken until the 27th, in doses as large as could be dispensed with on account of the great nausea which attended its exhibition. The urine was made in the quantity of four or five pints each day, during the whole time; the quantity then drank being seldom more than three pints. But now the sickness being exceedingly depressing, the strength failing, and the diuretic effects beginning to cease, the following prescription was directed.

R. Fol. Digitalis purpur. pulv. ℈ss.
Spec. Aromatic. ℈i. sp. lav. c. f. pilul. no. x. capiat i. nocte maneque, et alternis diebus sensim augeatur dosin.

In three days the effect of this medicine became visible, and when the dose of the Digitalis had been increased to six grains per day, the flow of urine generally amounted to seven pints every twenty-four hours. Not the least sickness, nor any other disagreeable symptom supervened, though he persevered in this plan until the end of *January*, at which time the dyspnœa was removed, and he has continued gradually to regain his flesh, strength, and appetite, without any relapse.

Case II.—About the middle of the year 1784, a lady aged 48, returned from London to her native air in Shropshire, under symptoms of complicated disease. It was your opinion that the plethoric state, consequent to that period when menstruation first begins to cease, had, under various appearances, laid the foundation of that deplorable state which now presented itself. The skin was universally of a pale leaden colour; her person much emaciated, and her strength so reduced as to disable her from walking without support. The appetite fluctuating, the digestion impaired so much that solids passed the intestines with little appearance of solution; she had generally eight or ten alvine evacuations every day, and without this number febrile symptoms, attended with severe vertiginous affection, and vomiting regularly ensued. The stools were of a pale ash colour. The urine generally pale, and at first in due quantity. The region of the stomach had a tense feel, without soreness; the feet and ancles œdematous, her sleep was uncertain; the pulse varying between 94 and 100, and feeble, except upon the approach of the menstrual periods, which were now only marked by its increased strength, and exacerbation of other febrile symptoms. Emetics, saline medicines, and gentle aperients were necessary to alleviate these. Six grains of ipecac. operated with sufficient power, and half a grain of calomel would have purged with great violence.

From the time of her arrival till the middle of *August*, mercury had been continued in various forms, and in doses such as the irritable state of her stomach and bowels would admit of. Spirit. nitri dulc.; sal. tartar. squill, and cantharides were alternately employed as diuretics, but without success, to retard the progress of an universal anasarca, which was then advanced to such a degree, and accompanied by so great debility, and other dreadful concomitants, as to threaten a speedy and fatal catastrophe.

On the 16th of *August* you first saw her, and directed thus—

R. Mercur. cinerei gr. ii.
Fol. Digital. purpur. pulv. ℈i. f. mass. in pill. no. xvi. dividend.—sumat unam hora meridiana, iterumque hora quinta pomeridiana quotidie.
Capiat lixivii saponac. gutt. L. in haust. juscul. sine sale parati omni nocte.

On the 20th the flow of urine began to increase, and she continued the medicine in the same dose until the 20th of *September*, discharging from six to eight pints of water each day for the first week, and which quantity gradually diminished as she became empty. During this period she complained not of any sickness, except from the lixivium, which was after the first dose reduced to twenty drops; and her appetite and strength increased daily, though it was evident that no bile had yet flowed into the bowels, nor was the digestion at all improved. The anasarcous appearances being then removed, the Digitalis was omitted, and pills, composed of mercur. cinereus, aloes, and sal tartari directed twice a day, with ʒi. of vin. chalybeat. in infus. amar. simpl.

Her amendment in other respects proceeded slowly, but regularly, from that time until the 9th of *October*, when the state of plethora again recurring, with its usual attendant symptoms, ℥iv. of blood were taken from the arm; and this was, upon the same occasion, repeated in the following month, with manifest good consequences, though in both instances the colour of the blood, as flowing from the vein, could hardly be called red, and the coagulum was as weak in its cohesion as possible. The state of the stomach and bowels was by this time greatly improved, in common with other parts of the system, but no intromission of bile had yet happened; the hardness about the hypogastric region, though less, continued in a considerable degree, and you ordered pills of mercury rubbed down, and rust of iron to be taken twice a day, with a decoction of dandelion and sal sodæ.

A cataplasm of linseed was applied every night over the stomach and right side; and, with little deviation from this plan, she continued to the end of the year, improving in her general health, but the hepatic affection yet remaining. It was then determined to try the effects of electricity, and gentle shocks were passed through the body daily, and as nearly as could be through the liver, in various directions.

On the fifth day there was reason to think that some gall had been secreted and poured out, and this became every day more evident; but it flowed only in small quantity, and irregularly into the bowels, as appeared from the fæces being partially tinged by it.

In *February* the lady left this neighbourhood, and though convalescent, yet so nearly well as to promise us the satisfaction of seeing her perfectly restored.

June 29th. The bile is now secreted in pretty good quantity, her appetite is perfectly good, her strength equal to almost any degree of exercise, and her health in general better than it has been for some years.

Case III.—Mr. W———, aged —, in *June*, 1782, was affected with slight difficulty in respiration, upon taking exercise or lying down in bed. These symptoms increased gradually until the end of *July*, when he complained of sense of weight and uneasiness about the præcordia, loss of appetite, and costiveness. The urine was small in quantity and high-coloured; his pulse feeble and intermitting; he breathed with difficulty when in bed, and slept little. After the exhibition of an emetic, and an opening medicine of rhubarb, senna, and sal tartari, he was directed to take half a dram of squill pill, pharm. Edinburg. night and morning, with ʒss. sal. sodæ in ℥iss. infus. amar. simpl. twice a day; and these medicines were continued during ten days, without any sensible effect. A blister was then applied to the sternum, and six grains of calomel given in the evening. The symptoms were now increased very considerably in every particular; and the following infusion was substituted for the former medicines:

R. Fol. Digital. purpur. ʒiii.
Cort. limon. ʒii. infund.
Aq. bullient. ℔i. per hor. 2 et cola. sumat cochl. i.
primo mane et repet. omni hora.

Sometime in the night considerable nausea occurred, and the following day he began to make water in great quantity, which he continued to do for three or four days. The pulse in a few hours became regular, slower, and stronger, and, in the course of a week, all the symptoms entirely vanished, and an electuary of cort. peruvian. sal martis, and spec. aromatic. confirmed his cure.

In *February*, 1784, this gentleman had a relapse of his disease, from which he again soon recovered by the same means, and is now perfectly well.

Case IV.—G——— A———, a husbandman, aged 57, was in the year 1782 affected with a slight, but constant pain in his breast, with difficult respiration. His countenance was yellow; the abdomen swelled and hard; his urine high-coloured and in small quantity; appetite and sleep little. Complained of frequent nausea and of sudden profuse sweatings, which seemed, for a short time, to relieve the dyspnœa.

After the exhibition of an emetic, six grains of calomel were given, with a purge of jalap in the morning, and repeated in a few days, with some appearance of advantage. He was then directed to take some pills of squill, soap, and rhubarb, with a draught twice a day, consisting of infus. amar. simp. and sal tartari. The skin soon became clearer, and the pain in his breast considerably diminished. But every other circumstance remaining the same, and a fluctuation in the belly being now more evident, the infusion of Digitalis, as prescribed in Case III. was given in the dose of one ounce twice a day.

On the fifth day, the effects were apparent, and he continued his medicine for a fortnight without nausea, making four or five pints of water every night, but little in the day, and gradually losing the symptoms of his disease.

In 1784, this person had a relapse, and was again cured by similar treatment.

Case V.—R——— H———, aged 43. Towards the end of the year 1783, became affected with slight cough and expectoration of purulent matter. In *December*, his skin became universally of a pale yellow colour. The abdomen was swelled and hard; his appetite little, and he complained of a violent and constant palpitation of the heart, which prevented him from sleeping. The urine pale and in small quantity. The pulse exceedingly strong and rebounding, beating 114 to 120 strokes every minute. He suffered violent pain of his head, and was very feeble and emaciated. After bleeding and the use of gentle aperient medicines, he continued to take the infusion of Digitalis for some days, without any sensible effect. Other diuretics were tried to as little purpose. Repeated bleeding had no effect in diminishing the violent action of the heart. He died in *January* following, under complicated symptoms of phthisis and ascites.

Case VI.—A man, aged 57, who had lived freely, in the summer of 1784, became affected with œdematous swelling of his legs, for which he was advised to drink Foxglove Tea. He took a four-ounce basin of the infusion made strong with the green leaves, every morning for four successive days.

On the 5th he was suddenly seized with faintness and cold sweatings. I found him with a pale countenance, complaining of weakness, and of pain, with a sense of great heat in his stomach and bowels. The swelling of the legs was entirely gone, he having evacuated urine in very large quantities for the two preceding days. He was affected with frequent diarrhœa. The pulse was very quick and small, and his extremities cold.

A small quantity of broth was directed to be given him every half hour, and blisters were applied to the ancles, by which his symptoms became gradually alleviated, and he recovered perfectly in the space of three weeks; except a relapse of the anasarca, for which the Digitalis was afterwards successfully employed, in small doses, without any disagreeable consequence.

Case VII.—S——— D———, a middle-aged single woman, was affected, in the year 1781, with a painful rigidity and slight inflammation of the integuments on the left side, extending from the ear to the shoulder. In every other particular she was healthy. The use of warm fomentations and opium, with two or three doses of mercurial physic, afforded her ease, and the inflammation disappeared, but was succeeded by an œdematous swelling of the part, which very gradually extended along the arm, and downward to the breast, back, and belly. Friction, electricity, and mercurial ointment were amongst the number of applications unsuccessfully employed to relieve her for the space of three months, during which time she continued in good general health.

In *November* she became ascitic, passing small quantities of urine, and soon afterwards a sudden dyspnœa gave occasion to suppose an effusion of water in the thorax. The Digitalis, squills, and cantharides were given in very considerable doses without effect. She died the latter end of *December* following.

CASE VIII.—W——— C———, a collier, aged 58, was attacked in the spring of 1783 with a tertian ague, which he attributed to cold, by sleeping in a coal-pit, and from which he recovered in a few days, except a swelling of the lower extremities, which had appeared about that time, and gradually increased for two or three months. The legs and thighs were greatly enlarged and œdematous. His belly was swelled, but no fluctuation perceptible. He made small quantities of high-coloured water. The appetite bad, and pulse feeble. He had taken many medicines without relief, and was now so reduced in strength, as to sit up with difficulty. An infusion of the Digitalis was directed for him, in the proportion of one ounce of the fresh leaves to a pint of water, two ounces to be taken three times a day, until the stomach or bowels became affected. Upon the exhibition of the sixth dose, nausea supervened, and continued to oppress him at intervals for two or three days, during which he passed large quantities of pale urine. The swelling, assisted by moderate bandage, rapidly diminished, and without any repetition of his medicine, at the expiration of sixteen days, he returned to his labour perfectly recovered.

OF THE

PREPARATIONS AND DOSES

OF THE

FOXGLOVE.

EVERY part of the plant has more or less of the same bitter taste, varying, however, as to strength, and changing with the age of the plant and the season of the year.

ROOT. This varies greatly with the age of the plant. When the stem has shot up for flowering, which it does the second year of its growth, the root becomes dry, nearly tasteless, and inert.

Some practitioners, who have used the root, and been so happy as to cure their patients without exciting sickness, have been pleased to communicate the circumstance to me as an improvement in the use of the plant. I have no doubt of the truth of their remarks, and I thank them. But the case of Dr. Cawley puts this matter beyond dispute. The fact is, they have fortunately happened to use the root in its approach to its inert state, and consequently have not over dosed their patients. I could, if necessary, bring other proof to show that the root is just as capable as the leaves of exciting nausea.

STEM. The stem has more taste than the root has, in the season the stem shoots out, and less taste than the leaves. I do not know that it has been particularly selected for use.

LEAVES. These vary greatly in their efficacy at different seasons of the year, and, perhaps, at different stages of their growth; but I am not certain that this variation keeps pace with the greater or lesser intensity of their bitter taste.

Some who have been habituated to the use of the recent leaves, tell me that they answer their purpose at every season of the year; and I believe them, notwithstanding I myself have found very great variations in this respect. The solution of this difficulty is obvious. They have used the leaves in such large proportion, that the doses have been sufficient, or more than sufficient, even in their most inefficacious state. The *leaf-stalks* seem, in their sensible properties, to partake of an intermediate state between the leaves and the stem.

FLOWERS. The petals, the stamens, and the pointal, have nearly the taste of the leaves, and it has been suggested to me, by a very sensible and judicious friend, that it might be well to fix on the flower for internal use. I see no objection to the proposition, but I have not tried it.

SEEDS. These, I believe, are equally untried.

From this view of the different parts of the plant, it is sufficiently obvious why I still continue to prefer the leaves.

These should be gathered after the flowering stem has shot up, and about the time that the blossoms are coming forth.

The leaf-stalk and mid-rib of the leaves should be rejected, and the remaining part should be dried, either in the sun-shine, or on a tin pan or pewter dish before a fire.

If well dried, they readily rub down to a beautiful green powder, which weighs something less than one-fifth of the original weight of the leaves. Care must be taken that the leaves be not scorched in drying, and they should not be dried more than is requisite to allow of their being readily reduced to powder.

I give to adults, from one to three grains of this powder twice a day. In the reduced state in which physicians generally find dropsical patients, four grains a-day are sufficient. I sometimes give the powder alone, sometimes unite it with aromatics, and sometimes form it into pills with a sufficient quantity of soap or gum ammoniac.

If a liquid medicine be preferred, I order a dram of these dried leaves to be infused for four hours in half a pint of boiling water, adding to the strained liquor an ounce of any spirituous water. One ounce of this infusion, given twice a day, is a medium dose for an adult patient. If the patient be stronger than usual, or the symptoms very urgent, this dose may be given once in eight hours; and, on the contrary, in many instances, half an ounce at a time will be quite sufficient. About thirty grains of the powder or eight ounces of the infusion, may generally be taken before the nausea commences.

The ingenuity of man has ever been fond of exerting itself to vary the forms and combinations of medicines. Hence we have spirituous, vinous, and acetous tinctures; extracts hard and soft; syrups with sugar or honey, &c. but the more we multiply the forms of any medicine, the longer we shall be in ascertaining its real dose. I have no lasting objection, however, to any of these formulæ except the extract, which, from the nature of its preparation, must ever be uncertain in its effects; and a medicine whose fullest dose in substance does not exceed three grains, cannot be supposed to stand in need of condensation.

It appears, from several of the cases, that when the Digitalis is disposed to purge, opium may be joined with it advantageously; and when the bowels are too tardy, jalap may be given at the same time, without interfering with its diuretic effects; but I have not found benefit from any other adjunct.

From this view of the doses in which the Digitalis really ought to be exhibited, and from the evidence of many of the cases, in which it appears to have been given in quantities six, eight, ten, or even twelve times more than necessary, we must admit as an inference either that this medicine is perfectly safe when given as I advise, or that the medicines in daily use are highly dangerous.

EFFECTS, RULES, AND CAUTIONS.

The Foxglove, when given in very large and quickly-repeated doses, occasions sickness, vomiting, purging, giddiness, confused vision, objects appearing green or yellow, increased secretion of urine, with frequent motions to part with it, and sometimes inability to retain it; slow pulse, even as slow as thirty-five in a minute, cold sweats, convulsions, syncope, death.*

When given in a less violent manner, it produces most of these effects in a lower degree; and it is curious to observe, that the sickness, with a certain dose of the medicine, does not take place for many hours after its exhibition has been discontinued; that the flow of urine will often precede, sometimes accompany, frequently follow the sickness at the distance of some days, and not unfrequently be checked by it. The sickness thus excited is extremely different from that occasioned by any other medicine; it is peculiarly distressing to the patient; it ceases, it recurs again as violently as before, and thus it will continue to recur for three or four days, at distant and more distant intervals.

These sufferings of the patient are generally rewarded by a return of appetite, much greater than what existed before the taking of the medicine.

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* I am doubtful whether it does not sometimes excite a copious flow of saliva.—See cases at pages 225, 257, and 258.

But these sufferings are not at all necessary; they are the effects of our inexperience, and would in similar circumstances, more or less attend the exhibition of almost every active and powerful medicine we use.

Perhaps the reader will better understand how it ought to be given, from the following detail of my own improvement, than from precepts peremptorily delivered, and their source veiled in obscurity.

At first I thought it necessary *to bring on and continue the sickness, in order to insure the diuretic effects.*

I soon learnt that the nausea being once excited, it was unnecessary to repeat the medicine, as it was certain to recur frequently, at intervals more or less distant.

Therefore my patients were ordered *to persist until the nausea came on, and then to stop.* But it soon appeared that the diuretic effects would often take place first, and sometimes be checked when the sickness or a purging supervened.

The direction was therefore enlarged thus—*Continue the medicine until the urine flows, or sickness or purging take place.*

I found myself safe under this regulation for two or three years; but at length cases occurred in which the pulse would be retarded to an alarming degree, without any other preceding effect.

The directions therefore required an additional attention to the state of the pulse, and it was moreover of consequence not to repeat the doses too quickly, but to allow sufficient time for the effects of each to take place, as it was found very possible to pour in an injurious quantity of the medicine, before any of the signals for forbearance appeared.

Let the medicine, therefore, be given in the doses, and at the intervals mentioned above:—let it be continued until it either acts on the kidneys, the stomach, the pulse, or the bowels; let it be stopped upon the first appearance of any one of these effects, and I will maintain that the patient will not suffer from its exhibition, nor the practitioner be disappointed in any reasonable expectation.

If it purges, it seldom succeeds well.

The patients should be enjoined to drink very freely during its operation. I mean, they should drink whatever they prefer, and in as great quantity as their appetite for drink demands. This direction is the more necessary, as they are very generally prepossessed with an idea of drying up a dropsy by abstinence from liquids, and fear to add to the disease by indulging their inclination to drink.

In cases of ascites and anasarca, when the patients are weak, and the evacuation of the water rapid, the use of proper bandage is indispensably necessary to their safety.

If the water should not be wholly evacuated, it is best to allow an interval of several days before the medicine be repeated, that food and tonics may be administered; but truth compels me to say, that the usual tonic medicines have in these cases very often deceived my expectations.

From some cases which have occurred in the course of the present year, I am disposed to believe that the Digitalis may be given in small doses, viz. two or three grains a day, so as gradually to remove a dropsy, without any other than mild diuretic effects, and without any interruption to its use until the cure be completed.

If inadvertently the doses of the Foxglove should be prescribed too largely, exhibited too rapidly, or urged to too great a length, the knowledge of a remedy to counteract its effects would be a desirable thing. Such a remedy may perhaps in time be discovered. The usual cordials and volatiles are generally rejected from the stomach; aromatics and strong bitters are longer retained; brandy will sometimes remove the sickness when only slight; I have sometimes thought small doses of opium useful, but I am more confident of the advantage from blisters. Mr. Jones *(Page 241)* in one case, found mint tea to be retained longer than other things.

CONSTITUTION OF PATIENTS.

Independent of the degree of disease, or of the strength or age of the patient, I have had occasion to remark, that there are certain constitutions favourable, and others unfavourable to the success of the Digitalis.

From large experience, and attentive observation, I am pretty well enabled to decide *a priori* upon this matter, and I wish to enable others to do the same: but I feel myself hardly equal to the undertaking. The following hints, however, aiding a degree of experience in others, may lead them to accomplish what I yet can describe but imperfectly.

It seldom succeeds in men of great natural strength, of tense fibre, of warm skin, of florid complexion, or in those with a tight and cordy pulse.

If the belly in ascites be tense, hard, and circumscribed, or the limbs in anasarca solid and resisting, we have but little to hope.

On the contrary, if the pulse be feeble or intermitting, the countenance pale, the lips livid, the skin cold, the swollen belly soft and fluctuating, or the anasarcous limbs readily pitting under the pressure of the finger, we may expect the diuretic effects to follow in a kindly manner.

In cases which foil every attempt at relief, I have been aiming, for some time past, to make such a change in the constitution of the patient, as might give a chance of success to the Digitalis.

By blood-letting, by neutral salts, by crystals of tartar, squills, and occasional purging, I have succeeded, though imperfectly. Next to the use of the lancet, I think nothing lowers the tone of the system more effectually than the squill, and consequently it will always be proper, in such cases, to use the squill; for if that fail in its desired effect, it is one of the best preparatives to the adoption of the Digitalis.

A tendency to paralytic affections, or a stroke of the palsy having actually taken place, is no objection to the use of the Digitalis; neither does a stone existing in the bladder forbid its use. Theoretical ideas of sedative effects in the former, and apprehensions of its excitement of the urinary organs in the latter case, might operate so as to make us withhold relief from the patient; but experience tells me, that such apprehensions are groundless.

INFERENCES.

To prevent any improper influence, which the above recitals of the efficacy of the medicine, aided by the novelty of the subject, may have upon the minds of the younger part of my readers, in raising their expectations to too high a pitch, I beg leave to deduce a few inferences, which I apprehend the facts will fairly support.

I.—That the Digitalis will not universally act as a diuretic.

II.—That it does do so more generally than any other medicine.

III.—That it will often produce this effect after every other probable method has been fruitlessly tried.

IV.—That if this fails, there is but little chance of any other medicine succeeding.

V.—That in proper doses, and under the management now pointed out, it is mild in its operation, and gives less disturbance to the system than squill, or almost any other active medicine.

VI.—That when dropsy is attended by palsy, unsound viscera, great debility, or other complication of disease, neither the Digitalis, nor any other diuretic can do more than obtain a truce to the urgency of the symptoms; unless by gaining time, it may afford opportunity for other medicines to combat and subdue the original disease.

VII.—That the Digitalis may be used with advantage in every species of dropsy, except the encysted.

VIII.—That it may be made subservient to the cure of diseases unconnected with dropsy.

IX.—That it has a power over the motion of the heart, to a degree yet unobserved in any other medicine, and that this power may be converted to salutary ends.

PRACTICAL REMARKS

ON

DROPSY,

AND

SOME OTHER DISEASES.

The following remarks consist partly of matter of fact, and partly of opinion. The former will be permanent; the latter must vary with the detection of error, or the improvement of knowledge. I hazard them with diffidence, and hope they will be examined with candour,—not by a contrast with other opinions, but by an attentive comparison with the phenomena of disease.

ANASARCA.

§ 1.—The anasarca is generally curable when seated in the subcutaneous cellular membrane, or in the substance of the lungs.

§ 2.—When the abdominal viscera in general are greatly enlarged, which they sometimes are, without effused fluid in the cavity of the abdomen, the disease is incurable. After death, the more solid viscera are found very large and pale. If the cavity contains water, that water may be removed by diuretics.

§ 3.—In swollen legs and thighs, where the resistance to pressure is considerable, the tendency to transparency in the skin not obvious, and where the alteration of posture occasions but little alteration in the state of distension, the cure cannot be effected by diuretics.

Is this difficulty of cure occasioned by spissitude in the effused fluids, by want of proper communication from cell to cell, or is the disease rather caused by a morbid growth of the solids, than by an accumulation of fluid?

Is not this disease in the limbs similar to that of the viscera? (§ 2.)

§ 4.—Anasarcous swellings often take place in palsied limbs, in arms as well as legs; so that the swelling does not depend merely upon position.

§ 5.—Is there not cause to suspect that many dropsies originate from paralytic affections of the lymphatic absorbents? And if so, is it not probable that the Digitalis, which is so effectual in removing dropsy, may also be used advantageously in some kinds of palsy?

ASCITES.

§ 6.—If existing alone, *i. e.* without accompanying anasarca, is in children curable; in adults generally incurable by medicines. Tapping may be used here with better chance for success than in more complicated dropsies. Sometimes cured by vomiting.

ASCITES AND ANASARCA.

§ 7.—Incurable if dependant upon irremediably diseased viscera, or on a gouty constitution so debilitated that the gouty paroxysms no longer continue to be formed.

In every other situation, the disease yields to diuretics and tonics.

ASCITES, ANASARCA, AND HYDROTHORAX.

§ 8.—Under this complication, though the symptoms admit of relief, the restoration of the constitution can hardly be hoped for.

ASTHMA.

§ 9.—The true spasmodic asthma, a rare disease, is not relieved by Digitalis.

§ 10.—In the greater part of what are called asthmatical cases, the real disease is anasarca of the lungs, and is generally to be cured by diuretics. (See § 1.) This is almost always combined with some swelling of the legs.

§ 11.—There is another kind of asthma, in which change of posture does not much affect the patient. I believe it to be caused by an infarction of the lungs. It is incurable by diuretics: but it is often accompanied with a degree of anasarca, and so far it admits of relief.

Is not this disease similar to that in the limbs at § 3, and also to that of the abdominal viscera at § 2?

ASTHMA AND ANASARCA.

§ 12.—If the asthma be of the kind mentioned at §§ 9 and 11, diuretics can only remove the accompanying anasarca. But if the affection of the breath depends also upon cellular effusion, as it mostly does, the patient may be taught to expect a recovery.

ASTHMA AND ASCITES.

§ 13.—A rare combination, but not incurable if the abdominal viscera are sound. The asthma is here most probably of the anasarcous kind (§ 10); and this being seldom confined to the lungs only, the disease generally appears in the following form.

ASTHMA, ASCITES, AND ANASARCA.

§ 14.—The curability of this combination will depend upon the circumstances mentioned in the preceding section, taking also into the account the strength or weakness of the patient.

EPILEPSY.

§ 15.—In epilepsy dependant upon effusion, the Digitalis will effect a cure; and, in the cases alluded to, the dropsical symptoms were unequivocal. It has not had a sufficient trial in my hands, to determine what it can do in other kinds of epilepsy.

HYDATID DROPSY.

§ 16.—This may be distinguished from common ascites, by the want of evident fluctuation. It is common to both sexes. It does not admit of a cure either by tapping or by medicine.

HYDROCEPHALUS.

§ 17.—This disease, which has of late so much attracted the attention of the medical world, I believe, originates in inflammation; and that the water found in the ventricles of the brain after death, is the consequence, and not the cause of the illness.

It has seldom happened to me to be called upon in the earlier stages of this complaint, and the symptoms are at first so similar to those usually attendant upon dentition and worms, that it is very difficult to pronounce decidedly upon the real nature of the disease; and it is rather from the failure of the usual modes of relief, than from any other more decided observation, that we at length dare to give it a name.

At first, the febrile symptoms are sometimes so unsteady, that I have known them mistaken for the symptoms of an intermittent, and the cure attempted by the bark.

In the more advanced stages, the diagnostics obtrude themselves upon our notice, and put the situation of the patient beyond a doubt. But this does not always happen. The variations of the pulse, so accurately described by the late Dr. Whytt, do not always ensue. The dilatation of the pupils, the squinting, and the aversion to light, do not universally exist. The screaming upon raising the head from the pillow or the lap, and the flushing of the cheeks, I once considered as affording indubitable marks of the disease; but in a child which I some time since attended with Dr. Ash, the pulse was uniformly about eighty-five (except during the first week, before we had the care of the patient:) the child never showed any aversion to the light; never had dilated pupils, never squinted, never screamed, when raised from the lap or taken out of the bed, nor did we observe any remarkable flushing of the cheeks, and the sleep was quiet, but sometimes moaning.

Frequent vomiting existed from the first, but ceased for several days towards the conclusion. One or two worms came away during the illness, and it was all along difficult to purge the child. Three days before death the right side became slightly paralytic, and the pupil of that eye somewhat dilated.

After death, about two ounces and a half of water were found in the ventricles of the brain, and the vessels of the dura mater were turgid with blood.

If I am right as to the nature of hydrocephalus, that it is at first dependant upon inflammation, or congestion, and that the water in the ventricles is a consequence, and not a cause of the disease, the curative intentions ought to be extremely different in the first and the last stages.

It happens very rarely that I am called to patients at the beginning; but in two instances wherein I was called at first, the patients were cured by repeated topical bleedings, vomits, and purges.

Some years ago I mentioned these opinions, and the success of the practice resulting from them, to Dr. Quin, now physician at Dublin. That gentleman had lately taken his degree, and had chosen hydrocephalus for the subject of his thesis in the year 1779. In this very ingenious essay, which he gave me the same morning, I was much pleased to find that the author had not only held the same ideas relative to the nature of the disease, but had also confirmed them by dissections.

In the year 1781, another case in the first stage demanded my attention. The reader is referred back to Case LXIX. for the particulars.

I have not yet been able to determine whether the Digitalis can or cannot be used with advantage in the second stage of the hydrocephalus. In Case XXXIII. the symptoms of death were at hand; in Case LXIX. the practice, though successful, was too complicated, and in Case

CLI. the medicine was certainly stopped too soon.

When we consider what enormous quantities of mercury may be used in this complaint, without affecting the salivary glands, it seems probable that other parts may be equally insensible to the action of their peculiar stimuli, and therefore that the Digitalis ought to be given in much larger doses in this than in other diseases.

HYDROTHORAX.

§ 18.—Under this name I also include the dropsy of the pericardium.

The intermitting pulse, and pain in the arms, sufficiently distinguish this disease from asthma and from anasarcous lungs.

It is very universally cured by the Digitalis.

§ 19.—I lately met with two cases which had been considered and treated as angina pectoris. They both appeared to me to be cases of hydrothorax. One subject was a clergyman, whose strength had been so completely exhausted by the continuance of the disease, and the attempts to relieve it, that he did not survive many days. The other was a lady, whose time of life made me suspect effusion. I directed her to take small doses of the pulv. Digitalis, which in eight days removed all her complaints. This happened six months ago, and she remains perfectly well.

HYDROTHORAX AND ANASARCA.

§ 20.—This combination is very frequent, and, I believe, may always be cured by the Digitalis.

§ 21.—Dropsies in the chest, either with or without anasarcous limbs, are much more curable than those of the belly. Probably because the abdominal viscera are more frequently diseased in the latter than in the former cases.

INSANITY.

§ 22.—I apprehend this disease to be more frequently connected with serous effusion than has been commonly imagined.

§ 23.—Where appearances of anasarca point out the true cause of the complaint, as in Cases XXIV. and XXXIV. the happiest effects may be expected from the Digitalis; and men of more experience than myself in cases of insanity, will probably employ it successfully in other less obvious circumstances.*

NEPHRITIS CALCULOSA.

§ 24.—We have had sufficient evidence of the efficacy of the Foxglove in removing the dysuria and other symptoms of this disease; but probably it is not in these cases preferable to the tobacco.*

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* Since the above paragraph was written, the most enlightened practitioners in that particular department have adopted the use of this remedy with decided advantage.—Ed.

OVARIUM DROPSY.

§ 25.—This species of encysted dropsy is not without difficulty distinguishable from an ascites; and yet it is necessary to distinguish them, because the two diseases require different treatment, and because the probability of a cure is much greater in one than in the other.

§ 26. The ovarium dropsy is generally slow in its progress; for a considerable time the patient, though somewhat emaciated, does not lose the appearance of health, and the urine flows in the usual quantity. It is seldom that the practitioner is called in early enough to distinguish by the feel on which side the cyst originated, and the patients do not attend to that circumstance themselves. They generally menstruate regularly in the incipient state of the disease, and it is not until the pressure from the sac becomes very great, that the urinary secretion diminishes. In this species of dropsy, the patients, upon being questioned, acknowledge, even from a pretty early date, pains in the upper and inner parts of the thighs, similar to those which women experience in a state of pregnancy. These pains are for a length of time greater in one thigh than in the other, and I believe it will be found that the disease originated on that side.

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* See an original and valuable treatise by Dr. Fowler, entitled, *Medical Reports of the Effects of Tobacco.*

§ 27.—The ovarium dropsy defies the power of medicine. It admits of relief, and sometimes of a cure, by tapping. I submit to the consideration of practitioners, how far we may hope to cure this disease by a seton or a caustic. In Case LXI. the patient was too much reduced, and the disease too far advanced to allow of a cure by any method; but it teaches us that a caustic may be used with safety.

§ 28.—When tapping becomes necessary, I always advise the adoption of the waistcoat bandage or belt, invented by the late very justly celebrated Dr. Monro, and described in the first volume of the Medical Essays. I also enjoin my patients to wear this bandage afterwards, from a persuasion that it retards the return of the disease. The proper use of bandage, when the disorder first discovers itself, certainly contributes much to prevent its increase.

OVARIUM DROPSY WITH ANASARCA.

§ 29.—The anasarca does not appear until the encysted dropsy is very far advanced. It is then probably caused by weakness and pressure. The Digitalis removes it for a time.

PHTHISIS PULMONALIS.

§ 30.—This is a very increasing malady in the present day. It is no longer limited to the middle part of life: children at five years of age die of it, and old people at sixty or seventy. It is not confined to the flat-chested, the fair-skinned, the blue-eyed, the light-haired, or the scrophulous; it often attacks people with full chests, brown skins, dark hair and eyes, and those in whose family no scrophulous taint can be traced. It is certainly infectious. The very strict laws still existing in Italy* to prevent the infection from consumptive patients, were probably not enacted originally without a sufficient cause. We seem to be approaching to that state which first made such restrictions necessary, and in the further course of time, the disease will probably fall off again, both in virulency and frequency.

§ 31.—The younger part of the female sex are liable to a disease very much resembling a true consumption, and from which it is difficult to distinguish it; but this disease is curable by steel and bitters. A criterion of true phthisis has been sought for in the state of the teeth; but the exceptions to that rule are numerous. An unusual dilatation of the pupil of the eye is the most certain characteristic.†

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* Also in Portugal. Vide vol. i. of these tracts.—Ed.

† Many years ago I communicated to my friend, Dr. Percival, an account of some trials of breathing fixed air in consumptive cases. The results were published by him in the second volume of his very useful Essays Medical and Experimental, and have since been copied into other publications. I take this

§ 32.—Sydenham asserts, that the bark did not more certainly cure an intermittent, than riding did a consumption. We must not deny the truth of an assertion from such authority, but we must conclude that the disease was more easily curable a century ago than it is at present.

§ 33.—If the Digitalis is no longer useful in consumptive cases, it must be that I know not how to manage it, or that the disease is more fatal than formerly; for it would be hard to deny the testimony cited at page 129. I wish others would undertake the inquiry.

§ 34.—When phthisis is accompanied with anasarca, or when there is reason to suspect hydrothorax, the Digitalis will often relieve the sufferings, and prolong the life of the patient.

§ 35.—Many years ago, during an attendance upon Mr. B———, of a consumptive family, and himself in the last stage of a phthisis, after he was so ill as to be confined to his chamber, his breathing became so extremely difficult and distressing, that he wished rather to die than to live, and

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opportunity of acknowledging that I suspect myself to have been mistaken in the nature of the disease there mentioned to have been cured. I believe it was a case of *Vomica,* and not a true *Phthisis* that was cured. The Vomica is almost always curable. The fixed air corrects the smell of the matter, and very shortly removes the hectic fever. My patients not only inspire it, but I keep large jars of the effervescing mixture constantly at work in their chambers.

urged me warmly to devise some mode to relieve him. Suspecting serous effusion to be the cause of this symptom, and he being a man of sense and resolution, I fully explained my ideas to him, and told him what kind of operation might afford him a chance of relief; for I was then but little acquainted with the Digitalis. He was earnest for the operation to be tried, and, with the assistance of Mr. Parrott, a very respectable surgeon of this place, I got an opening made between the ribs upon the lower and hinder part of the thorax. About a pint of fluid was immediately discharged, and his breath became easy. This fluid coagulated by heat.

After some days a copious purulent discharge issued from the opening, his cough became less troublesome, his expectoration less copious, his appetite and strength returned, he got abroad, and the wound, which became very troublesome, was allowed to heal.

He then undertook a journey to London; whilst there he became worse; returned home, and died consumptive some weeks afterwards.

PUERPERAL ANASARCA.

§ 36.—This disease admits of an easy and certain cure by the Digitalis.

§ 37.—This species of dropsy may originate from other causes than child-birth. In the beginning of last *March*, a gentleman at Wolverhampton desired my advice for very large and painful swelled legs and thighs. He was a temperate man, not of dropsical habit, had great pain in his groins, and attributed his complaints to a fall from his horse. He had taken diuretics, and the strongest drastic purgatives with very little benefit. Considering the anasarca as caused by the diseased inguinal glands, I ordered common poultice and mercurial ointment to the groins, three grains of pulv. Fol. Digitalis night and morning, and a cooling diuretic decoction in the day-time. He soon lost his pain, and the swellings gradually subsided.

AN
ACCOUNT
OF THE
SCARLET FEVER
AND
Sore Throat;
OR,
SCARLATINA ANGINOSA:

PARTICULARLY
AS IT APPEARED AT BIRMINGHAM
IN THE YEAR 1778.

TO WHICH ARE NOW PREFIXED
SOME REMARKS ON THE NATURE AND CURE OF
THE ULCERATED SORE THROAT.

OF THE

SCARLET FEVER

AND

ULCERATED SORE THROAT.

Physicians are now pretty well agreed, that the Scarlet Fever of Sydenham is a very different disease from that described by our countryman Dr. Morton in the last, or by Dr. Cotton in the present century: but doubts yet remain whether this last disease, which Sauvage has not inaptly called the Scarlatina anginosa, be or be not the same with the Angina gangrænosa or ulcerated Sore Throat of Fothergill and Huxham. Each opinion has its abettors, and each may boast the support of very high authority.

Early in life I had opportunities of seeing much of the ulcerated Sore Throat, and under the sanction of practitioners, to whom I looked up with deference and respect, I saw it universally treated with port wine, bark, acidulated gargles and antiseptic steams. This mode of practice was not unsuccessful; sooner or later it was very universally adopted; and as the disease never again became so prevalent as I had seen it in my younger days, I felt no inducement to alter the mode of treatment.

In the first edition of this pamphlet it was remarked, that the Scarlet Fever of 1778, "was preceded by some cases of the ulcerated Sore Throat."—Upon further examination my notes refer to two families in Birmingham affected by it in the month of February, to two more in April, and to several in and about Hales Owen in the winter and spring. These did well under the established treatment; but in the month of May, when the Scarlet Fever first became a very prevalent epidemic at this place, although the great resemblance of its leading characteristics induced us to adopt the treatment which long experience had approved in the Angina gangrænosa, with such modifications as the more urgent inflammatory symptoms seemed to require, yet the want of success necessarily determined us to seek for other remedies, and the beneficial consequences resulting from a very different mode of practice first made me suspect that the two diseases were really distinct.

But in attempting to discriminate them, difficulties occurred which could not fairly be done away; and I was forced to confess that, distinct as they appeared to be in the two extremes, in other points they ran insensibly into each other, so that I found it impossible to draw an exact line between them. Still, however, I was disposed to consider them as distinct diseases, from a conviction that they who had once gone through the Scarlatina anginosa could never be infected by it again; whilst no such exemption operated in favour of such as had suffered from the ulcerated Sore Throat; and an instance was brought forward of the children of Mr. G———t, who had the ulcerated Sore Throat in May, and the Scarlet Fever, &c. in the following August. But I have now reason to believe there was an error in this account, and that the disease in May was apthous; for upon further inquiry it appears, that the gums and inside of the cheeks were affected as well as the throat, and that the remedies applied to the mouth were such as are daily used in apthous cases.

My chief reason, however, for wishing to establish the difference of the two diseases, was the necessity which I then thought indisputable, for the difference in practice. Had it merely rested as an abstract consideration, it would not have occasioned me a moment's anxiety; but under a persuasion that the welfare of the sick depended upon a distinction of the two diseases, I drew up a tabular view, in which I endeavoured to collect the leading symptoms of the ulcerated Sore Throat on one side, and those of the Scarlatina anginosa on the other. This table is reprinted without any alteration, as it is equally useful whether we consider it as exhibiting a contrasted view of two distinct diseases, or only as pointing out the different aspects of the same disease under different circumstances.

Since the year 1778, our epidemic has frequently presented itself to my observation, both in the town of Birmingham, and its neighbourhood, as well as in several parts of the surrounding counties. From the most assiduous attention to the subject ever since that time, from observing it in every difference of season, exposure, age, and temperament, I am now persuaded that the Scarlatina anginosa and the Angina gangrænosa constitute but one species of disease; that they owe their existence to the same specific contagion; that the varieties in their appearance depend upon contingent circumstances, and that the greatest differences are not greater than those of the distinct and confluent small-pox.

Further observation, aided by the concurrent testimony of many of my colleagues in this place, engaged in extensive practice, confirm me in the opinion that the infection of the Scarlatina anginosa, like that of the measles and small-pox, can only be taken once. That it is not generated under any known circumstances like the poison of the Typhus or low fever, but that it is from time to time propagated by contagion, like the other eruptive fevers just now mentioned.

From several publications on the subject by foreign physicians, it appears to have raged with uncommon violence in Denmark, Sweden, and the North of Germany, the year before it became so general in England, and I know that its existence amongst us may be traced from that time to the present.

It is pretty generally believed, that those who have once had the ulcerated Sore Throat, are more liable than others to be seized with it again. This opinion is so incompatible with what has just now been asserted, that it ought not to be passed over in silence, especially as it was one of the principal grounds on which I had rested my former belief. But to the best of my recollection, the cases which I thought so much in point, were cases of what was usually called a *specked* throat, and from later and more accurate observations, made with a particular view to the question, I have been convinced that this kind of secondary disease, viz. the Specked Throat, does occur very frequently in those who have suffered from the ulcerated Sore Throat; but it is not infectious, and except the specks in the throat, it wants every other leading characteristic of the disease.

The mucous membrane lining the throat, is, in many people, liable to smaller or larger specks or sloughs, very different in their nature from those which appear in the ulcerated Sore Throat, but the injury which that membrane sustains from that disease, is probably one of the predisposing causes; and under a strong predisposition, every catarrhal affection seems sufficient to produce them. After the devastation occasioned by the Angina gangrænosa in 1748, and for several succeeding years, the fauces were anxiously inspected by the patient as well as by the practitioner, and the first appearance of a speck or a slough excited an alarm; bark, port wine, &c. were ordered, and the patients recovered, though probably not quite so soon as they would have done if these remedies had been neglected.

There is yet another feature which seems to indicate an essential difference in the two diseases; I mean the subsequent anasarcous affections, so common after the febrile state of the Scarlatina anginosa, but rarely succeeding to the ulcerated Sore Throat. If these dropsical appearances are supposed to depend upon the debility consequent to the increased and violent action of the capillary subcutaneous vessels during the eruptive state, or if again upon the morbid affections of the lymphatics from the absorption of the poisonous miasmata, the dropsy should appear after one disease as well as after the other, when the scarlet on the skin had been nearly the same in both. But the fact is, that the scarlet colour of the skin is much more frequent, more constant, and more intense in one state of the disease than in the other; and whilst in the one the skin is uniformly dry, in the other it is bedewed with sweat towards morning; thus probably expelling a large proportion of the poison which otherwise must have been absorbed.

The practical considerations which so forcibly urged me heretofore to maintain the difference of the two diseases, cannot alone be thought to establish any specific difference. The same specific contagion, acting in different circumstances, produces the distinct or the confluent small-pox; why then may not the same poisonous matter produce either the Scarlatina anginosa or the ulcerated Sore Throat, according as the seasons and the subjects predispose to inflammation in the former case, or to debility in the latter?

I still allow that some differences in the practice are requisite in these different appearances of the disease; but the experience of several years has now convinced me, that the old antiseptic treatment of the ulcerated Sore Throat is not the best possible. Soon after the first publication of this work, the late excellent Dr. Fothergill favoured me with the communication of his more mature opinions about the Angina gangrænosa, and mentioned his intention of publishing a new edition of his tract on that subject, as soon as he should have leisure to revise it; but as he did not live to accomplish this design, the reader will thank me for the following sentiments of that able physician:

"I have long been dissatisfied with the treatment of this disease, and in prescribing bark have rather yielded to the opinions of others than followed the suggestions of my own judgement."

From so many opportunities of observing the good effects of early, powerful, and repeated vomits in the Scarlatina anginosa, it was natural to expect that the same treatment would be attended with similar advantages in the ulcerated Sore Throat, especially when I became convinced that both diseases were the offspring of the same specific contagion. The result of this practice, invariably continued for several years past, has been so greatly to the advantage of my patients, that I do not hesitate to recommend it as by far the most efficacious mode of treating the ulcerated Sore Throat, particularly at its commencement. Dr. Fothergill had nearly made the same discovery, for at page 55 of his Treatise, he says, "If we are called in at first, whilst the sickness or vomiting continues, it will be of use to promote this discharge, by giving an infusion of green tea, chamomile flowers, carduus, or a few grains of ipecacuanha. In some instances, *where the attack has been severe*, and this method practised, *the disorder has gone off with more ease than was at first apprehended.*"

I find it useful to allow these patients animal food, in whatever form it can best be taken, with wine proportioned to the degree of debility. In the intervals between the emetics, a solution of fixed alkaline salt is useful, given in a decoction of contrayerva root, or in camphor mixture, adding testaceous powders if there be a tendency to purge; and well knowing the danger of this tendency, I do not think it safe to allow the use of vegetable acids or acescent fruits. When the fever is pretty well subdued and the danger over, the bark may be given with propriety during the state of convalescence.

Of the Scarlet Fever and Sore Throat, as it appeared at Birmingham in the Year 1778.

THIS disease appeared in Birmingham about the middle of May, 1778, and in the beginning of June was frequent in many of the towns and villages in the neighbourhood. It was preceded by some cases of the ulcerated Sore Throat, and accompanied in its course through the summer by the chin-cough, the measles, and the small-pox, with several instances of the common quinsy.

It continued in all its force and frequency to the end of October, varying however in some of its symptoms as the air grew colder. In the beginning of November, it was rarely met with; but, towards the middle of that month, the air again becoming warmer, it increased again, and, in some measure, resumed those appearances which it possessed in the summer months, but which it had lost during the cold winds in October.

It affected children more than adults; but seldom occurred in the former under two years of age, or in the latter when more than fifty. In children, the number of boys and girls that suffered from it was nearly equal, but in adults the number of female patients considerably exceeded that of the male; probably because the former were more employed in attendance upon the sick, and, consequently, more exposed to the infection.

On the first seizure, the patients felt an unusual weariness or inaptitude to motion, a dejection of spirits, and a slight soreness or rather stiffness in the throat; with a sense of tightness in the muscles of the neck and shoulders, as if they were bound with cords. This symptom sometimes became very painful, so that it was difficult to prevail upon the younger patients to throw their heads sufficiently back, to allow of a full inspection of the throat. In a few hours, chilly fits took place, generally alternating with flushing heats; but, at length, the heat prevailed altogether. The patients now complained of slight headach, and transitory fits of sickness. They passed a restless night, not so much from pain, as from want of inclination to sleep.

The next day the soreness in the throat increased, and they found a difficulty in swallowing, but the difficulty seemed less occasioned by the pain excited in the attempt, or by the straitness of the passage, than by an inability to throw the necessary muscles into action. A total disrelish to food took place, and the sickness frequently arose to a vomiting. The breathing was short, and often interrupted by a kind of imperfect sigh. The skin felt hot and dry, but not hard; and the patients experienced frequent, small, pungent pains in different parts of the skin, as if touched with the point of a needle. Towards evening the heat and restlessness increased; the breath became hot and burning to the lips; the patients wished to drink, but the tendency to sickness, and the exertions necessary to frequent deglutitions, were so unpleasant that they seldom cared to drink much at a time. This night was passed with still greater inquietude than the former. In the morning, the face, neck, and breast appeared redder than usual; in a few hours, this redness became universal, and increased to such a degree of intensity, that the face, body, and limbs resembled a boiled lobster in colour, and were evidently swollen. Upon pressure, the redness vanished, but soon returned again. The skin was smooth to the touch, nor was there the least appearance of pimples or pustules; but now and then a case occurred, with a few circular livid spots interspersed amongst the red colour, particularly on the neck and breast; but this appearance did not portend a more unfavourable termination of the disease. The eyes and nostrils partook more or less of the general redness; and in proportion to the intensity of this colour in the eyes, the tendency to delirium prevailed.

This state continued for two or three days longer; the intense scarlet then gradually abated, a brown colour succeeded, and the skin becoming rough, peeled off in small branny scales. The tumefaction subsided at the same time, and the patients gradually recovered their strength and appetite.

During the whole course of the fever, the pulse was quick, small, and uncommonly feeble: the bowels regular in their discharges: the urine small in quantity, but scarcely differing in appearance from that of a person in health: the submaxillary glands were generally enlarged, and rather painful when pressed upon.

The tongue was red and moist at the end and at the sides, but drier in the middle, and more or less covered with a yellowish brown mucus. The velum pendulum palati, the uvula, the tonsils, and the gullet, as far as the eye could reach, partook of the general redness and tumefaction. I never saw any real ulceration in these parts; but, sometimes, collections of thick mucus, particularly on the back of the œsophagus, greatly resembled the specks or sloughs in the ulcerated sore throat, but they were easily washed away by the injection of any common gargle. After the fever ceased, it was not uncommon to have abscesses form on one or both sides of the neck under the ears, but the matter easily discharged itself through the ruptured teguments, and they healed in a few days, without much trouble.

The above is a picture of the disease as it then most usually appeared; but it too frequently assumed a much more threatening aspect; for, in children, the delirium commenced in a few hours after the first seizure, which was marked by symptoms of extreme debility. The flesh was intensely hot; the scarlet colour appeared on the first or second day; and they died very early on the third.

In others, who survived this rapid termination, when the scarlet colour turned to brown, and their recovery might have been expected, the pulse still remained feeble and quick; the skin became dry and harsh; the mouth parched; the lips chopped and black; the tongue hard, dry, and dark brown; the eyes heavy and sunk: they expressed an aversion to all kinds of food, and extreme uneasiness upon the least motion or disturbance. Thus they lay for several days, nothing seeming to afford them any relief. At length, a clear amber-coloured matter discharged in great quantities from the nostrils, or the ears, or both, and continued so to discharge for many days. Sometimes this discharge had more the appearance of pus, mixed with mucus. Under these circumstances, when the patients did recover, it was very slowly; but they generally lingered for a month or six weeks from the first attack, and died at length of extreme debility.

In adults, when more violently attacked, the rapidity of the fever, the delirium, &c. was such, that they died upon the fourth or fifth day, especially if a purging supervened. Some survived to the eighth or to the eleventh day; in all these the throat was but little affected: the eyes had an uncommonly red appearance, not that streaky redness which is evidently occasioned by the vessels of the cornea being injected with red blood, but an equable shining redness, resembling that which we may observe in the eye of a ferret. But, notwithstanding this morbid appearance in the eye, the strongest light was not offensive. This redness might often be discovered by lifting up the upper eyelid, some hours before it showed itself in the part of the eye that is usually visible, and it was of some consequence to attend to this circumstance, as it greatly influenced the event of the case.

These patients were extremely restless, clamorous, and desirous to drink; but after swallowing one or two mouthfuls, upon taking another, they seemed to forget to swallow, and let it run out at the corners of the mouth; whilst others spirted it out with considerable force, and were very angry if urged to drink again. In these cases the scarlet colour appeared very soon after the attack, but in an unsettled irregular manner; large blotches of red, intermixed with others of white, and these often changing places.

Besides the full scarlet colour described above, there were frequently small circular spots of a livid colour above the breast, the knees, and the elbows. The pulse, from the very beginning, was so quick, so feeble, and so irregular, that it was hardly possible to count it for half a minute at a time. It is needless to add, that the greater part of those who laboured under these dreadful symptoms died. A few recovered, and others fell into a state of debility bordering upon idiotism, from which they were at length rescued by time and generous living.

In one patient, a man, the jaw was so perfectly locked upon the third day, that it was impossible to get any thing down his throat; and he died early upon the fifth day. In another man, when the scarlet of the skin was turning brown, several white blisters appeared upon different parts of his hands and feet, which, when cut open, contained no liquid; but in a boy who had similar blisters, some of which were cut in a few hours after their appearance, a thin pellucid watery fluid was discharged; and, in this case, the scarlet colour of the skin, the second day after its appearance, changed to a dark lead, or rather violet colour. I have been told of three instances, in which the desquamation was so complete, that even the nails separated from the fingers.

These were the appearances during the hot months; but in the month of October, when the air became colder, the scarlet colour of the skin was less frequent, and less permanent. Many patients had no appearance of it at all, whilst others, especially adults, had a few very minute red pimples, crowned with white pellucid heads, but these appeared only in the parts where the skin is most tender. The inside of the throat was very considerably tumefied, so as to render deglutition painful and difficult; its colour a dull red, sometimes tending to a livid. This affection of the fauces in some patients seemed to extend down the gullet to the stomach, and was accompanied mith painful efforts to vomit, particularly whenever any thing was swallowed. In others it spread itself down the windpipe to the lungs, as was evident from the cough, the straight-breathing, the apprehension of suffocation, and other peripneumonic symptoms. In others, again, its progress along the *Eustachian* tube was indicated by sharp pains in the ear. The eyes did not now bear the light, though they had less of that redness described before, but still a slight tinge of it was visible, together with something of the shining watery appearance which is so remarkable in the measles. The patients too complained of a general painful soreness in all their limbs, and not unfrequently of very acute pains in the ancles, knees, wrists, and elbows, attended with more or less swelling where the pain was most violent. These swellings had sometimes a reddish shining appearance, very like the gout.

In most of these cases the pulse beat 130 or 140 strokes in a minute; it was small, but yet hard, and sometimes sufficiently so to justify the opening of a vein. The blood thus taken away, in every instance when cool, appeared sizy, and the whole crassamentum firm.

Through the course of the disease, large quantities of viscid mucus, and other matter, with much of the purulent appearance, were from time to time discharged from the throat and nostrils.

Some patients threw out several white or ash-coloured sloughs, though no such sloughs were visible upon inspecting the throat; but in most, the fauces, particularly the tonsils, were covered with them, and upon their separation looked raw, as if divested of their outer membrane.

The fever, under this autumnal appearance, generally terminated favourably on the fifth, eighth, or eleventh day, but sometimes was protracted to a much greater length, by the formation of large painful abscesses; and I have been told of several cases that were followed by a numerous succession of boils upon different parts of the body. But no symptom was more troublesome to some individuals than small ulcerations on the sides and down towards the root of the tongue, which were so painful as to deprive them of the power to take solid food, even for several days after the inclination for it had returned.

From a retrospective view of all the cases which I attended at this time, it appears that the fever was of longer duration in adults than in children; that it was more fatal to men than to boys, and more so to boys than to girls. Out of 139 cases of the worst kind, 33 of the patients were adult females, all of whom recovered. It was particularly fatal to lying-in women; I heard of three only under these circumstances, and they all died; as likewise did the only two children I saw, who had the scarlet fever and the small-pox at the same time.

Of the Consequential Dropsy.

The anxiety of the physician, and the danger of the patient, generally cease with the disease which gave rise to them; but this was not the case with the disorder now under consideration, for it often happened, that in ten or fifteen days from the cessation of the fever, another train of symptoms demanded the attention of the former, and exercised the sufferings of the latter. They felt, after a few days' amendment, a something that prevented their further approach to health; an unaccountable langour and debility, together with a stiffness in their limbs, an accelerated pulse, disturbed sleep, disrelish to food, and a paucity of urine.

These symptoms were soon followed by an universal swelling of the anasarcous kind, and sometimes an ascites. In some patients the feverish disposition ran high, in others it existed only in a moderate degree. In some the dropsy affected the brain, producing coma-vigil, delirium, blindness, with the most enlarged expansion of the iris, which was incapable of contraction in the strongest light. In others the dropsy affected the lungs, and produced every symptom of the hydrops pectoris. The tongue was dry and brown, the skin harsh, the urine of a deep mahogany colour, small in quantity, and depositing a sediment of a still deeper hue, and in a powdery form.

The urgency of these symptoms, added to the very evident appearance of disease, soon compelled the patients to apply for assistance; and the event, under the mode of treatment hereafter to be described, was almost always favourable.

Of the Scarlet Fever, as described by Medical Authors.

THE Scarlet Fever, in its simple state, is not a very uncommon disease. Sydenham gives us a chapter upon this kind of scarlet fever, in which he observes,* that it generally makes its appearance toward the end of summer, that it attacks whole families, but particularly children; that they are seized with chillness and shivering as in other fevers, but without much sickness. Afterwards the whole skin is covered with small red spots, more numerous, much broader, of a fuller red, but less uniform than those of the measles, that they continue two or three days. After they disappear, and the skin is scaled off, a kind of branny scales remain, which fall off, and again appear for two or three times.

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* Scarlatina febris, licèt nullo non tempore possit incidere, ut plurimum tamen exeunte æstivo se prodit, quo quidem integras familias, infantes vero præ cæteris infestat. Rigent, horrentque sub initio ut in aliis febribus, qui hâc afficiuntur, neque vehementer admodum ægrotant: postea cutis universa maculis parvis rubris interstinguitur, crebrioribus certè et multo latioribus, magisque rubentibus, at non perinde uniformibus, ac sunt illæ quæ *Morbillos* constituunt. Ad duos trésve dies persistunt hæ maculæ, quibus demum evanescentibus decedentéque subjectâ cuticulâ, restant furfuraceæ quædam squamulæ ad instar farinæ corpori inspersæ, quæ ad secundam aut tertiam vicem se promunt, conduntque vicissim. - - - - - - - - - - - - - - - - - Satis habeo, ut æger à carnibus in solidum abstineat, et à liquoribus spirituosis quibuscunque, tum ut neque usquam forâs prodeat, neque se perpetim lecto affigat. Cute jam penitùs desquamatâ, et cessantibus symptomatis, è re fore existimo ut purgetur æger leni aliquo medicamento, ætati atque viribus accommodo. Simplici hâc et naturali planè methodo, hoc morbi *nomen* (vix enim altius assurgit,) sine molestiâ, aut periculo quovis facillimè abigitur. - - - - - - Veruntamen hoc animadvertendum volo. Si *convulsiones Epilepticæ* vel etiam *Coma*, huic morbo sub initium eruptionis supervenerint (quod quandoque accidit in pueris ac junioribus hoc morbo laborantibus) omnino oportet ut *Epispasticum* amplum ac forte posteriori cervici applicetur, atque, porro ut *Paregoricum* è Syrupo de Meconio statim exhibeatur, repetendum singulis noctibus usque dum convaluerit; imperando interim ut æger bibat pro potu ordinario lac cum triplo

He uses no medicines, but thinks it sufficient that the patients abstain from flesh meats, and from strong liquors; that they keep within doors, but not in bed. After the desquamation of the skin is completed, he advises a gentle purge. Thus, says he, by this plain and simple method, this disease (if it deserve the *name* of a disease) departs without trouble or danger.

Afterwards he adds, that sometimes in children or young persons, epileptic convulsions or coma take place in the first stage of the eruption, and then it is necessary to apply a large blister to the neck, to give a dose of diacodion, which must be repeated every night; and to give milk, boiled with thrice its quantity of water, for common drink.

Nearly to the same purpose is the account given by Dover in his Physician's Legacy, who says,

aquæ coctum, et à carnis esu abstineat. Sydenham, sect. sexta. Cap. 2.

this fever is of a very mild nature, more manageable than that of the measles, and does not stand in need of the assistance of medicine.

Equally tractable with this, is the Scarlet Fever that De Gorter has observed in Holland. He says it chiefly prevails amongst children; that after three or four days' continuation of a slight fever, scarlet blotches appear. That they remain but a short time, vanish insensibly, and leave a kind of branny scales behind them. That previous to the eruption, the patients complain of pains, anxiety, heat, and cough, but that these symptoms are never dangerous.*

The disease thus described by Sydenham and De Gorter is by no means uncommon in England, but it differs very much from that which is the subject of these pages. It does not appear to be infectious, and is probably, as De Gorter supposes, occasioned by some irritating matter in the alimentary canal. But our Scarlatina anginosa seems, undoubtedly, to have existed in London in the summer of the year 1689, with symptoms so violent, that Morton, who has transmitted us the account of it,* calls it a kind of plague. He does not, in the cases he relates, mention particularly the affection of the throat, but in the eleventh history (page. 53) he notices swellings and suppurations of the parotids, producing great difficulty in swallowing, and the discharge of acrid and corrosive matter from the nose, ears, and fauces. In another patient a tumor formed in the left armpit, and suppurated; and a lady had an abscess formed just above the pubis, which became gangrenous. He then mentions in terms of admiration. how much he had observed the tonsils, the uvula, the fauces, and the nostrils to have been tumefied; how greatly the lips were sometimes swollen, and covered with sordid scabs and exulcerations. As what is related in this history contains the whole of his observations which approach the nearest to our disease I shall subjoin it in his own words, for the satisfaction of the reader.† But, after all, this author erroneously considered the Scarlet Fever and the measles to be the same thing. He

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* Macularum Scarlatinus color quæ in levi febre oboriuntur; huic morbo dedit nomen. Incipiunt plerumque in tenella ætate, tertio vel quarto die febris levioris; non diu persistunt, insensibiliter evanescunt, relictis in cute quibusdam furfuribus; in facie inchoare solent sensim latiores factæ maculæ. Reliquam etiam interdum tegunt corpus. Levis videtur biliosa corruptio calore antecedentis æstatis in tenella ætate, motu febrili ad cutem pulsa, ubi exarescens materia corpus relinquit sanum.

Hæc materia ante eruptionem oberrans, generat febrem, calorem, dolorem, anxietatem, tussim, sine periculo. De Gorter Prax. Med. tom. 2, page 196.

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* Exercitatio tertia. Cap. 5.

† Ante sexennium mediâ æstate simul decumbebant in domo Domini Hook tres ejus filiæ, filiolus unicus, atque Domina Barnadiston ejus matertera, matrona annos septuaginta plus minûs nata. Omnes quasi veneno deleterio perculsi febre, Synochus, unum tenorem servante corripiebantur, Tussi Ferinâ, comate, deliriis, ceterisque malignitatis symptomatis haud obscuris afflicti. Ideóque natura symptomatum id exigente, Alexipharmaca mitiora exhibenda, atque epispastica applicanda jussi. Die autem morbi quarto, quinto, vel sexto, singuli scarlatinam efflorescentiam per cuticulam ubique sparsam perpetiebantur, eámque per septem, octo, vel decem dies protensam. Duæ è filiabus atque filiolus, quarto, vel quinto efflorescentiæ die parotidibus insignibus affligebantur, unde deglutitio adeò præpediebatur ut in

præsens vitæ subsidium (inflammatione urgente, et forti arteriarum vibratione adhortante) venam secare et moderatâ manu sanguinem detrahere coactus essem. Alexipharmacorum autem et Vesicatorium ope continuatâ, glandulæ parotides (utut venæsectione earum dolor et ardor mitigarentur) debito tempore exulcerabantur, atque apostematis ruptis pus acre et corrosivum per nares, aures et fauces copiosè egerebatur, unde triginta dierum spatio sensim revalescebant. Filia autem natu secunda die tertio vel quarto efflorescentiæ immaniter vociferabatur præ dolore ingente axillam finistram occupante. Quo circa sanguinem; è brachio adverso detraxi ad dolorem mitigandum, ex quo dolor allevabatur. Continuatis autem remediis alexipharmacis tumor increvit, buboni non dissimilis, qui tandem exulceratus pus copiosum per plurimos dies effudit, quo demum sanato integram sanitatem formosa ac elegans puellula recuperavit. Verum Domina Barnadiston cùm ad plures dies malè se habuisset, et omnem remediorum usum neglexisset, tandem post sex vel septem dies elapsos carcinomate paulo supra pubem corripiebatur, quod spatio unius vel alterius diei præ virulentiâ veneni per partem affectam excreti gangrænâ tentabatur. Alexipharmacis autem et epispasticis diligenter adhibitis, et auxiliis chirurgicis peritè applicatis, præter spem adstantium ab hac peste, licet difficulter admôdum evasit, atque postea ad tres annos superfuit. A *Peste* (inquam) evasit, quoniam venenum morbi prædicti, pestilentialis fermenti malignitatem adæquabat; et si quando venenum isti usmodi morbillosum crisi perfectà per cuticulam propelli haud potest, tanquam venenum pestilentiale glandulas sponte petit narium, faucium, inguinum, &c. eásque inflammat et exulcerat, nec non carcinomata, bubones et parotidas excitat. Quantùm tonsillas, uvulam, fauces, nares, et quam diu intumuisse vidi! quàm turgida nonnunquam labia! et quam sordidâ scabie obducta et exulcerata ab eâdem causâ animadverti! ut nuperrimè filiolo domini Blaney accidet, qui post efflorescentiam peractam febre, comate, et prædicto symptomate diu affligebatur. Exercit. 3. Cap, 5, p. 53, 54.

defines them as such in his Synopsis Febrium,* and in another place observes † that, notwithstanding this disease has, from the general concurrence of physicians, obtained a particular name, yet he thinks it to be altogether the same as the measles, differing only in the mode of the eruption; the former being a continued inflammation or redness equally diffused over the whole cuticle, the latter existing in the form of distinct, oblong, or angular blotches.‡

So long ago as the beginning of the seventeenth century, Sennertus, physician to the Elector of Saxony, observed the Scarlet Fever in its more malignant form, and has given us a pretty good description of it in his chapter upon the small-pox and measles.§ After speaking of the latter, he says, there is yet another variety which he has sometimes, but not very frequently, observed, and that he is in doubt by what name to distinguish it,|| for although it occupies the whole body

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* Exercitatio prima. Cap. 2, p. 41.

† Hunc morbum (utut universali medicorum consensu titulo peculiari donetur) prorsus eundem esse cum morbillis censeo, et solo efflorescentiæ modo ab illis distare, &c. Cap. 5, p. 43.

‡ Efflorescentiam hanc, interstitiis figurâ diversâ, oblongâ scilicet quadratâ, vel multangulâ præditis variegatam observare est: namque non unâ continuatâ inflammatione seu rubedine, ut in febre scarlatinâ, perfunditur cuticula. Quo criterio duntaxat hæc efflorescentia ab altera quæ febrem scarlatinam comitatur dignoscenda est. Cap. 3, p. 17.

§ Sennertus de Febribus. Lib. 4, cap. 5.

|| Præter has differentias adhuc alia est, sed rarior quidem quam aliquoties observavi, quo nomine tamen ab aliis discer-

like an erysipelas, yet the erysipelas chiefly seizes upon adults, but this disease attacks children only, therefore he rather chooses to refer it to the measles. He then describes it in words to the following effect. "Upon the fourth or fifth day of the disease, red fiery blotches appear over the whole body, but without any remarkable swelling. In the height of the disease, this fiery redness occupies the whole surface, not unlike an universal erysipelas. In the decline, the general redness abates, and broad red blotches again appear

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nerem, hactenus dubius fui. Etsi enim instar erysipelatis totum ferè corpus prehendat; tamen non vidi quod adultos, quod in erysipelate fieri ferè solet, sed infantes solùm corripiat. Malo ergò ad morbillos referre. - - - - - - - - - - - - - - - - Maculæ rubræ et quasi ignitæ cum vix effatu digno tumore per universum corpus quasi quædam parva erysipelata erumpunt in principio, seu morbi die quarto vel quinto. In statu verò universum corpus rubrum et quasi ignitum apparet, ac si universali erysipelate laboraret. In declinatione rubor ille imminui, et maculæ rubræ latæ, ut in principio iterum apparent, quæ tandem septimo vel nono die evanescunt, epidermide squamarum instar decidente. Malum verò hoc grave ac periculosum et sæpe lethale est. Nam calor est ferventissimus, sitis inextinguibilis, et plerumque pulmonum (unde tusses excitantur) faucium et aliorum viscerum inflammationes, deliria et alia mala urgent. In declinatione tandem materia ad articulos extremorum transfertur, ac dolorem et ruborem, ut in arthriticis excitat. Cutis squamarum instar decidit, moxpedes ad talos et suras usque intumescunt, hypochondria læduntur, respiratio difficilior redditur, tandèmque abdomen intumescit, ægrique non sine magno labore, et post longum tempus pristinæ sanitati restituuntur, sæpé etiam moriuntur. Sennertus, lib. 4, cap. 12, p. 190, 191.

as in the beginning. These at length fade upon the seventh or ninth day, and the skin peels off. This disease is severe, dangerous, and frequently fatal; for the heat is extreme, the thirst inextinguishable, and accompanied in most cases with delirium, inflammation of the fauces, of the lungs, and of other viscera. In the decline of the fever, the matter is transferred to the joints of the extremities, and there excites redness and pain resembling the gout. The skin falls off in scales, and presently afterwards, the feet and legs swell, the hypocondres are affected, the respiration is rendered more difficult, and at length the belly swells. These patients require great care and a length of time to recover their former health: but they often die."

Schultzius describes the Scarlet Fever and Sore Throat under the name of *purpura epidemia maligna*, as it appeared in Poland in the spring of the year 1664.* He remarks, "That the winter was mild and rainy,† that the disease appeared early in the spring, and continued to rage through the whole of the summer and autumn, even to the winter following. That it proved fatal to a great number of children of each sex but hardly affected any that were beyond twelve years of age."

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* Miscellanea Naturæ Curiosorum. Annus 6, 7. Obs. 145, p. 206.

† Cum anno 1664 hyems mollis et pluviosa esset, grassabatur apud nos vere primo insequente purpura epidemia maligna, quæ per totam æstatem et autumnum usque in hyemem sæviebat, plurimosque infantes utriusque sexus, et duodecim annum attingentes (nam ultra hanc ætatem vix ascendebat) perimebat. Plerique secundâ die morbi, nonnulli etiam primâ morièbantur; illi solummodò evadebant, qui nulla faucium inflammatione vel tumore œdematoso (variabant enim ista pro diversitate naturarum) infestabantur. Tum omnibus ab isto morbo liberàtis, post copiosum sudorem (nonnullis etiam diarrhœa, sed tantùm

He says, "They mostly died upon the second day; some upon the first. Those only survived who had no inflammation in the throat, and no œdematous tumour. In those who recovered, after a copious sweat, the redness of the skin vanished, and a desquamation followed. In some a diarrhœa of one or two days' continuance proved critical. After some time, especially in the older patients, the whole body was affected with a swelling like the leucophlegmacy; the belly likewise swelled. These symptoms continued very troublesome for several weeks; they were carried off by sweating, and sometimes by a plentiful flow of urine."

In the Medical Transactions of Berlin, Decad. vol. i. page 20, we find our disease tolerably well characterised in a few words.*

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unius vel alterius diei critica profuit) squamæ decidebant, rubore cutis evanescente. Tandem, præsertim natu majoribus, tumor totius corporis, instar leucophlegmatiæ, et infimi ventris sequebatur, qui per aliquot septimana miseris molestus erat, sudoreque etiam solvebatur, interdum etiam urinâ largius profluente.—Miscell. Nat. Cur. Ann. 6, 7, p. 206.

* Invasit febris scarlatina patientes cum rigoribus, cephalalgia, et cardiaca nausea, quam excipiunt, communiter vomitus: efflorescit quarto vel quinto die sensim atque sensim,

" In the Scarlet Fever the patients are attacked with shiverings, headach, nausea; and a vomiting generally succeeds. The efflorescence, which is preceded by an elevation of the papillæ of the skin, occasioning a roughness, gradually appears upon the fourth or fifth day, extending itself over every part of the body, and accompanied with a degree of intumescence, so that the outward appearance of the patient resembles a lobster boiled. This red colour spreads over the edges of the eyelids, the corners of the eyes, and the inside of the nostrils. - About the seventh day, but without any previous sweat, the intense colour abates, the skin begins to peel off, and then it is, whilst the disease seems to be upon the decline, that the patients are endangered from congestions about the fauces, accompanied with apthous inflammation."

In the year 1749, Dr. Cotton published " Observations on a particular kind of Scarlet Fever, that lately prevailed in and about St. Alban's." This disease showed itself about the end of September,

post præcedaneam asperam papillularum cutanearum elevationem, rubedine per universum corpus a capite usque ad calcem, cum cutis aliquali intumescentia, ita ut patientum externus aspectus, referat ideam cocti cancri. Ista rubedo interiora narium, limbosque et angulos oculorum obducit - - - - - - - - - - - - - versum, septimum diem, sines udoribus, rubor iste fit remissior, cuticulaque inchoat desquamari, et tunc maxime, dum morbus declinare videtur, fauces aphthodeo-inflammatoria congestione periclitantur.—Acta Med. Berol. Decad. vol. i. p. 20, et seq.

1748, and his description of it accords very well with its autumnal appearance with us. He considers it as different from the Scarlet Fever of Sydenham, and the same as that described by Morton. This was undoubtedly the same epidemic which Dr. Fothergill called a Sore Throat, attended with ulcers, and which he has so well described as it appeared in London and the parts adjacent in the year 1739, and at intervals for several years afterwards.

In the years 1751 and 1752, Dr. Wall and Dr. Huxham described it as existing in their respective neighbourhoods of Worcester and Plymouth. Since that time we have had many other accounts of it by different authors; but as their works are easily procured, and ought to be in the hands of every practitioner, it is unnecessary for me to take up the reader's time with a particular account of them here.

Navier published a letter upon the epidemic diseases of the year 1753, in which he has recorded a history of the Scarlet Fever and Sore Throat, corresponding much nearer to our disease than any account which we have yet examined.*

He sets out with observing† that " When the

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* See Plenciz Tractatus de Scarlatina. See also Commentaria de Rebus. Part i. vol. iv. p. 338. The original is published in French, but we have taken the Latin translation as given by Plenciz.

† Variolis tandem a mediocri orto frigore fere penitus extinctis, tempestate dein paulo mitius facta, alius apparuit epidemicus morbus, variolis longe magis inflammatorius, febris

air grew colder, the small-pox almost entirely ceased; upon a warmer air again prevailing,

nimirum rubra, scarlatina dicta. Hic morbus per febrem admodum vehementem se manifestavit, quæ animi deliquiis, lassitudinibus spontaneis, capitis fauciumque doloribus deglutitionem impedientibus, comitata erat.

Secundo die, et sæpe post viginti quatuor vel triginta horas in toto corpore maculæ rubræ, vivido scarlatino colore, largæ, manus magnitudinem sæpe excedentes figuræ irregularis, et dorsum, pectus, femora et nates sæpe ita tegentes, ut unica tantum esse videretur, apparuerunt. Hæ maculæ quovis fere momento disparentes, se in alia loca erysipelatis more conferre videbantur, in quibus antea non fuerant. Manus easdem tangens, calorem vividam et ardentem præcipue in adultis sentiebat, et cutis ruberrima digito compressa albescens, remoto digito rursus rufescebat.

Pulsus parvus et frequens erat, et respiratio difficilis et intercepta et singultuosa in plurimis esse videbatur. Halituosus vapor e pulmonibus egrediens adeo calidus et urens deprehendebatur, ut unusquisque hunc percipiens, faciem ab egro statim avertere cogeretur. Hæc febris, etiam interdum cum manuum et brachiorum inflatione conjuncta fuit, integrasque familias, aut insimul, aut successive invasit—Vidit Cl. Auctor infantes hoc morbo laborantes, quibus prodigiosa leucophlegmatia supervenit. Quidam hac febre laborans et usque ad palpebras leucophlegmaticus, parcissimam brunam urinam reddens, qualem in hac febre sæpissime, imo interdum sanguinolentem secedere asserit Cl. Auctor, præmissis præmittendis ab omnibus symptomatibus vesicatorium applicatione, liberatus fuit.

Quidem ventrem flatibus distentum, et linguam valde siccam, plurimi vero humidam habent. Iis qui emergunt, epidermis, quinto vel sexto die per squamas decidit, quinimo adolescenti tredecim vel quatuordecim annorum tota manus pedisque cuticula, exceptis unguibus, decidit. - - - - - - - - - - - - -
Nisi ægro statim in primo morbi impetu sucurratur, escharæ gangrænosa in fundo faucium versus arcus et velum palati superveniant, et hisce ortis pauci emergunt. Hæc gangræna

another epidemic disease appeared, far more inflammatory in its nature than the small-pox, viz. the Red or Scarlet Fever. This disease begins with a most violent Fever, accompanied with faintings, great weariness, pains of the head and throat, and a difficulty in swallowing.

"On the second day, and frequently after twenty-four or thirty hours, large red spots, mostly larger than one's hand, of a bright scarlet colour, and irregular in their figure, appear all over the body, covering the back, the breast, the thighs, and the haunches so completely, that they are of one continued scarlet colour. These spots are disappearing almost every moment, and, like an erysipelas, again appearing in places that they did not occupy before. They feel of a sharp biting heat, especially in adults; and though so extremely red, when pressed by the finger turn white, but the pressure being removed, they become red again.

œsophagum asperamque arteriam sæpe ante occupat, quam illam percipere, illique medere queamus. - - - - - - - - - - - - - Quidam ac febre rubra affecti quarto, vel quinto die eodem modo pereunt, ac si per inflammationem gangrænosam pulmonum suffocati essent. Alii post vehemens delirium morientes, magnam saniei quantitatem per os et nares reddunt, et rubræ antea maculæ, post mortem in quibusdam prosus violaceæ conspicuuntur. Hæc symptomata vero in infantibus longe minus violentia sunt, remediisque facile cedunt. - - - - - - - - - - - - Infantes, hac febre Scarlatina decumbentes, ordinarie ante febrem tussi ferina laborarunt, quæ vero cum febre sese imminuit, et cum illa quoque evanuit. D. de Navier. In Comment. de Rebus. Pars prima. Vol. iv. p. 338. Vide etiam Plenciz Tract. de Scarlatina.

"The pulse is quick and small, the respiration for the most part difficult, interrupted, and sobbing. The breath so hot and burning that whoever feels it is obliged to turn away his face from the patient. Sometimes the hands and arms are swollen.

"This Fever attacks whole families either altogether or successively."

Navier observes, that he has seen this disease in young children followed by a prodigious leucophlegmacy. In one case the leucophlegmacy affected even the eyelids; the urine was brown and very small in quantity, as was generally the case; indeed it sometimes appeared bloody. This patient was cured by the application of blisters, after other necessary steps had been taken.

In some he says the belly was distended, and the tongue very dry, but in general it was sufficiently moist.

In those who recover, the skin scales off upon the fifth or sixth day, and one youth, thirteen or fourteen years of age, lost the cuticle from his hands and feet entire, excepting only the nails." - - - - - - - He proceeds to observe that, "Unless the patient be relieved at the first attack of the disease, gangrenous eschars appear at the bottom of the fauces towards the velum pendulum palati, and when these take place but few recover. This gangrene frequently seizes upon the œsophagus and the windpipe, before we perceive or endeavour to counteract it. - - - - - - - - - - - Some patients die upon the fourth or fifth day, with the symptoms of suffocation from a gangrenous inflammation of the lungs. Others who die violently delirious, discharge a large quantity of sanies from the mouth and nostrils, and the scarlet blotches after death sometimes change to a violet colour. These symptoms in young children are far less violent, and easily yield to remedies."

In another place Navier says, "It is not unusual for young children to have a severe cough before the attack of the Fever; which becomes less troublesome when the Fever comes on, and ceases along with it."

Sauvage, in his Nosologia Methodica*, amongst other species of the Scarlatina, mentions the Scarlatina anginosa of the year 1765. This seems to agree very well with our disease. He says, that† "in the summer of that year a Scarlet Fever prevailed at Montpelier amongst young children. The whole body was intensely red, the voice hoarse, the throat ulcerated, sometimes gangrenous."

Dr. Plenciz, a very celebrated physician at Vienna, in his *Tractatus de Scarlatina*, has added something to the history of the disease. He is the first author who mentions the appearance of white blisters when the desquamation of the skin takes place, and he gives us the best account extant of the dropsical state that succeeds. He thinks the danger to the patients is greater from the dropsy than from the Scarlet Fever; but that was not the case with us. He takes some pains to investigate the cause of the disease, and is much more diffuse upon the method of cure than any of his predecessors: but these things will come to be noticed in their proper place.

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* Page 454, quarto edition.

† Hac æstate Monspelii viget apud infantes scarlatina, in qua totus truncus intense rubet cum voce rauca, et angina

From the description of this disease as it existed at Birmingham, and from the accounts transmitted to us by other authors, the reader will, I hope, be enabled to attain a pretty accurate knowledge of it, notwithstanding its multifarious appearances. It only remains, in order to perfect the history, to relate the appearances found in the body after death; but the only instructive circumstance arising from the few examinations that have been made, is the enlargement of the lymphatic glands in the neck, and also of the mesenteric glands; thus pointing out the channels through which the contagious matter enters the system, and supporting the positions assumed at page 356, 357—on the three first of which, the most powerful part of the mode of treatment here pointed out, is founded.

The only examination, which I find upon record, of a subject who died in the secondary stage of the disease, is that made by Doringius,* a friend

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ulcerosa, imò in quibusdam gangrænosa. Sauvage Nosol. Meth. Class 3, G. 8, Sp. 6.

* Ita observavit Cl. D. M. Doringius, ut literis ad me datis scripsit, puerum quendam Uratislaviæ post hunc morbum pedibus, cruribus, scroto, ventro ac facie intumuisse, cum genarum

to Sennertus. He relates the case of a boy who survived the first attack of fever, but afterwards "had swollen feet, legs, scrotum, belly, and face; a perpetual flushing in his cheeks, an irregular fever, a cough attended with a frothy pituitous expectoration, and great difficulty in breathing. Seven days before his death, after most laborious and rattling breathing, with a sense of oppression at his chest, upon the breaking of an abscess, he coughed up pus and black blood. Seven days afterwards, being attacked again with similar symptoms, he died.

Upon opening the body the whole cavity of the chest was filled with yellow water; both lobes of the lungs were livid and gangrenous; a large abscess was found in the left. The cavity of the abdomen was filled with a similar watery fluid. The omentum, nearly wasted. The liver, pale in colour, and, in proportion to the subject, of an amazing size."

nonulla ac perpetuoque rubore, febricula irregulari, tussique paucâ, eaque spumosa saltem et pituitosa rejiciebat, difficultate respirandi summa. Hic septimo die antequam moreretur, post summam respirandi difficultatem, ponderis sensum circa pectus, ac stertorem, pulmonis abscessu rupto pus et sanguinem atrum tussi rejecit, et huic septimo ab illo paroxysmo die, cum eadem symptomata redirent, mortuus est. Corpore aperto, tota pectoris cavitas aqua citrina repleta, pulmonesque ambo toti lividi et gangrenosi conspiciebantur, et sinister magnum intus abscessum fovebat. Abdomine aperto, innatabant intestina tota simili aqua: omentum prope consumptum videbatur. Hepar quod pro individui ratione portento sæ fuit magnitudinis, subpallidum.—Sennertus, lib. iv. cap. xii. p. 191, edit. 1650.

Of the Diagnostic Symptoms.

The Scarlet Fever and Sore Throat is so nearly related to some other fevers of the axanthematous kind, that it is not always easy to distinguish them, without having an eye to the prevailing epidemic of the season. An attempt, therefore, to point out the characteristic differences, cannot be unacceptable.

In fevers of the *Petechial* kind, the eruption seldom appears before the fourth day; it consists of distinct spots, regular in their form, and principally occupying the neck, the back, and the loins. But in the *Scarlet* Fever the eruption generally appears about the third day; consists either of broad blotches or else one continued redness, which spreads over the face and the whole body.

In the fever called *Purpura*, the pustules are prominent, keep their colour under pressure, and never appear early in the disease. Whereas in the Scarlet Fever, the eruption appears early after the attack, is not prominent, but smooth to the touch, and becomes quite white under pressure. These diseases are certainly distinct in themselves, and not mere modifications in the eruption only, though they seem connected by some general cause; for we had several examples of the true *Purpura* at the time the *Scarlatina* prevailed; but I know a gentleman who first had the *Scarlatina*, and shortly afterwards the *Purpura:* now I never yet have seen an instance of the same person having the Scarlet Fever twice, and I believe it to be as great an improbability as a repetition of the small-pox.

The *Measles* are so nearly allied to the Scarlet Fever, that we find some of the best medical writers have considered them as no way differing, but in the mode of the eruption; the former rising above the skin, and limited in their extent, the latter smooth and universally diffused But not to mention that the patients who had gone through the measles were equally subject with others to the Scarlatina, we may observe that, the teazing cough, the running at the nose, the sneezing, the watery eye, symptoms so predominant in the early state of the former, were never observed to exist in the latter; at least, with us. I confess to have met with one case of the Scarlatina in which a troublesome cough arose upon the seventh day, and disappeared on the tenth; but in the measles it is a leading symptom, and continues not only during the eruption, but commonly for many days afterwards.

The *Erysipelas* may, in many circumstances, vie with the Scarlatina; but the limited seat of the former, together with its not being contagious, at least, in our climate, and the absence of a Sore Throat, are sufficient to distinguish it from the latter. We may likewise take into the account, that, in the most frequent species of the erysipelas, there is a constant oozing of an acrid watery fluid from the inflamed parts; which is never the case in the Scarlatina anginosa.

I have drawn up a tabular view of the leading symptoms, &c. of our disease in its two states of high inflammation, on the one hand, and of prevalent debility on the other. Physicians conversant with the disease cannot fail to observe its existence in almost every imaginable intermediate state. But though I have prefixed the epithet, *putrid*, to the right hand column, as contrasted with the word *inflammatory*, on the left, I use it merely as a term to which the prevalence of custom has affixed the ideas of certain appearances, without meaning to imply a belief that any thing really and literally putrid can exist in an animated substance.

SCARLATINA ANGINOSA.

Inflammatory State.	*Putrid State.*
Season. Summer—autumn.	*Season.* Spring—winter.
Air. Hot—dry.	*Air.* Warm—moist.
Places. High—dry—gravelly.	*Places.* Close—low—damp—marshy.
Subjects. Vigorous—both sexes alike—robust in most danger.	*Subjects.* Delicate — women and female children—robust adults not in danger.
Skin. Full scarlet—smooth—if pimply the pimples white at the top—always dry and hot.	*Skin.* Red tinge—pimply—the pimples redder than the interstices—bedewed with sweat towards morn.
Eyes. Shining, equable, intense redness—rarely watery.	*Eyes.* Inflamed and watery, or sunk and dead.
Throat. In summer, tonsils, &c. little tumefied — no sloughs—in autumn more swelled—integuments separating—sloughs white.	*Throat.* Tonsils, &c. considerably swelled and ulcerated—sloughs dark brown.
Breath. Very hot, but not fœtid.	*Breath.* Offensive to the patients and their assistants.
Voice. In summer natural.	*Voice.* Flat and rattling.
Bowels. Regular at the accession.	*Bowels.* Purging at the accession.
Blood. Buffy—firm.	*Blood.* Florid—tender.
Termination. The 3d, 5th, 8th, or 11th day.	*Termination.* No stated period.

Of the Causes of the Scarlet Fever and Sore Throat.

How far the appearance of this disease depends upon the constitution of the air, how far upon the state of our bodies influenced by the productions of the seasons, and how far again upon the concomitant existence of other diseases, are matters that nothing short of the experience of ages can determine. Schultzius observes,* that the winter of the year 1664, in Poland, was mild and rainy; the *Scarlatina Anginosa* appeared early in the following spring, and raged all summer and autumn, even until the winter following. The last winter with us was uncommonly mild; the spring dry and cold; the summer dry, and remarkably hot. In October the air was unusually cold. November was a wet month; the first week cold, the middle of the month warm. The disease began in May; it raged with great violence in June, July, and August; in September the scarlet colour was less intense, and in October the skin was frequently not at all affected, but the Fever in other respects nearly the same, and the complaints in the throat greatly augmented. In the warm weeks of November, the scarlet colour was more frequent again.—During the months of September, October, and November, the instances of the disease in the town of Birmingham were fewer than in the four preceding months; but during the former part of that period, all the towns and villages in the neighbourhood, and many separate houses, in high, dry, gravelly situations suffered greatly; whilst the inhabitants of wet, low, or sheltered places, either knew not the disease at all, or if they did, it was only in its mildest form.—The product of vegetable substances this year was great; indeed it was universally allowed that the crops of almost every kind were greater than they had been for many years past.—It has been already observed, that the small-pox, the measles, and the hooping cough, were with us the concomitants of the Scarlet Fever; and that it was preceded in the winter and spring by the ulcerated Sore Throat. Navier too remarks* that it succeeded to the small-pox; and Morton observed it to prevail together with the measles.

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* Loco citato.

As to the immediate cause of this disease, those who are best acquainted with the present imperfect state of knowledge are the least likely to expect a satisfactory answer to such an inquiry. Morton says,† "It is a poison defiling the animal spirits, whose malignity does not only overwhelm the spirits in its first attack, but breaks down the mass of blood by agitation, into an acrid colluvies, more powerfully than any other ferment."

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* Loco citato.

† Causa morbillorum continens seu immediata est Venenum spiritus inquinans, quod non tantùm in primo morbi stadio malignitate suâ spiritus obruit, sed massam sanguinis agitando eam in colluviem acrem, præ cæteris omnibus fermentis colliquefacit. Loc. citat.

Navier[*] thinks the cause of the *Scarlatina Anginosa* is something acrid, caustic, and putrefactive, like that of the measles. He believes that a similar cause produces the sweating sickness, the gangrenous apthæ, the dysentery; and that it is analogous to the distemper amongst the cattle. He endeavours to support this last opinion by observing that when the cattle recover they lose their hair, and their skin peels off; when they die, the viscera are always more or less in a gangrenous state. Hence he concludes, that our disease was communicated by contagion from cattle to mankind. He thinks too it is some how connected with the small-pox, because a great number of children had it a little before or a little after the small-pox.

Plenciz[†] attributes the effects to certain animated seminal particles, *Semina animata*, which he thinks are capable of multiplying their kind. He supposes they may be wafted by the winds to considerable distances, or that they may sometimes lie dormant a long time in the body; and thus he accounts for the production of the disease when it did not previously exist in the neighbourhood.

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[*] Causam hujus morbi non solum cum illa, quæ sudorem anglicam, aphtham gangrænosam, dysenteriam, &c. excitavit, eandem esse dicit, sed in miasmate, quod cum morbilloso comparat, acri caustica et putrefaciente consistere ipsumque morbum analogiam alere perhibet cum morbo epidemico pecorum. His enim convalescentibus pili et epidermis eodem modo deciderunt, ac hominibus cuticula, et in cadaveribus pecorum apertis semper viscera quædem gangrænosa invenit Cl. Auctor.

Ex pecorum igitur morbo hanc febrem per contagium ortum esse arbitratur, eandemque cum variolis ideoquoque convenire asserit, quia magnus infantum numerus eandem brevi ante vel post variolas habuerit. Plenciz Tractat.

[†] Tract. de Scarlat. p. 64—68.

But whether this disease be caused by animalcula capable of generating their kind, or by certain miasmata, which have the property of assimilating other particles of matter to their own nature, by some mode of fermentation hitherto but little understood, there can be no doubt but it is contagious, and perhaps so in a degree nearly equal to the small-pox and measles.

I have repeatedly had occasion to observe, that it is upon the third or fourth day after exposure to the contagion that the patients begin to complain. Its first effect is evidently that of a poison of the sedative kind, acting upon the nervous system. Its first seat seems to be the pituitary, or *Schneiderian* membrane; every part of which it presently pervades, passing from thence down the œsophagus to the stomach, down the larynx to the lungs, along the *Eustachian* tubes to the ears; from the nose to the eyes, and to the brain itself.

The redness of the skin does not necessarily imply a determination of the poison to the surface of the body; because we know instances of a similar effect being almost instantaneously produced by certain affections of the stomach, How many people after eating muscles, have we not heard of, that have experienced great anxiety, presently followed by a general redness upon the skin; and which again was soon removed by the exhibition of a vomit, to discharge the contents of the stomach. Who has not observed the full scarlet flush upon the face after eating herrings or vinegar; after drinking acetous beer, or cider? Can any body suppose that in the one case, the offending matter is instantly conveyed to the skin? or, that in the other, it is carried from thence instantaneously as the contents of the stomach are evacuated?

I know a young lady, to whose constitution oatmeal is so inimical, that in a few minutes after swallowing the smallest quantity, a general scarlet colour, accompanied by a sensible tumefaction, takes place upon her skin.

Mrs. H———, a married lady, experiences similar effects from eating the spawn of a lobster; and I knew a gentleman, who had often suffered extremely, from the smallest quantity of sweet almonds, inadvertently taken in food or in medicine.

I shall only add further upon this subject, that the effects of acids just now mentioned, like those ascribed to the miasmata of the *Scarlatina Anginosa*, are by far the most remarkable in hot weather.

At the time when the disease prevailed here in its fullest force, and all were alarmed for themselves and their connexions, the best preventive method was anxiously inquired after. Some smoked, some chewed, and others snuffed tobacco, some rubbed their hands and faces with *thieves' vinegar;* many wore camphor at the pit of the stomach, and still more swallowed bark and port wine. But those who were much conversant with the disease, had too ample occasion to observe that none of these methods were effectual. Would it not be as reasonable to expect that we may find a substance capable of destroying the activity of the small-pox matter, as that we can hope for one which shall prove a prophylactic to the poison of the Scarlet Fever and Sore Throat?

However vain our hopes may be, built upon such a foundation, yet if my conjecture be true, that the poison first makes its lodgement upon the mucus separated by the pituitary membrane lining the nose and fauces, it will be of some consequence to those who, from their attendance upon the sick, are necessarily exposed to the infection, to hawk up and spit out frequently the mucus that collects in the fauces, and likewise to promote the discharge of that which lodges in the nostrils.

From the same consideration, I am led to advise those who, having already imbibed the poison, are seized with the first symptoms of the disease, immediately to take an emetic; frequently to wash their fauces with soap leys, largely diluted with water; and to snuff something up the nose that will occasion sneezing. The first and last of these indications are sufficiently obvious, and the other is founded upon the facility with which the caustic fixed alkali dissolves mucus, and the quality it has of destroying all the peculiar properties of animal matter. If these precautions are attended to, I can venture to assert, from a pretty large experience, that the infection will either be altogether prevented, or else very trifling in its consequences. After the operation of the emetic, I generally direct the patient to go to bed, and drink plentifully of wine whey with spirit of hartshorn.

It is of peculiar importance also to know that the progress of the infection may be stopped by the use of very practical precautions, such as may be adopted in almost every house. When it first appeared among us, it often ran through whole families, and in boarding-schools particularly it made such havoc, that most of the schools in the town and vicinity of Birmingham were under a necessity of dispersing; and the yet healthy children of many families were sent from home; but this method contributed to spread the infection more widely and more rapidly through the country.

From the time that Dr. Haygarth first communicated to me his ideas of stopping the progress of the small-pox, the probability of stopping the progress of the Scarlet Fever, by the adoption of similar methods, was too evident to escape the most inattentive observer. The first trials proved successful; and the full body of evidence elucidated by the clearest reasonings, which appeared soon afterwards from the same masterly hand,* encouraged me to proceed; and now for several years past, I have never thought it necessary either to break up a school, or to disperse a private family. Allotting apartments on separate floors to the sick and to the healthy; choosing for nurses the older parts of the family, or such as had had the disease heretofore, and prohibiting any near communications between the sick or their attendants, and the healthy, with positive orders instantly to plunge into cold water all the linen, &c. used in the sick chambers, has very universally been found sufficient to check the further progress of the infection. But for more particulars, I wish to refer the reader to Dr. Haygarth's book.

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* See Haygarth's Inquiry how to prevent the Small-Pox. Chester, printed 1784.

Method of Cure.

Amongst the multiplicity of medical writers, only a few have favoured us with the description of the *Scarlet Fever and Sore Throat;* and fewer still with the method of cure.

Morton, considering this and the measles to be the same disease, directs the practice to be the same in both; and in this he is a much better guide than those who have written more expressly upon the subject. I can believe that the constitutions of the natives in different parts of Europe, will allow of a considerable difference in the method of treatment; but I am persuaded that those who practise in England with success, will find more occasions to depart from than to concur with the methods advised by the French and German authors.

Instead of tracing the progressional steps of the disease over again, and pointing out the plan of treatment in every different stage of its course, and under the variously different appearances which it is so ready to adopt, I believe it will be the shorter way to consider the different remedies which have been proposed; to point out how far I have found them in actual practice to be useful or detrimental; and afterwards to subjoin a few cases, the better to illustrate the mode of application.

But preparatory to this, I must beg the attention of the reader to a few principles, which did not derive their origin from any preconceived theory, but from actual observation, aided by a reference to the general laws of the system; and I am persuaded that those who, after an attentive consideration of the disease, appear to differ from me in these points, will in reality find that difference to consist more in words than in sentiments; and that this difference is caused by the difficulty of selecting terms untinctured by the theories of the schools.

I.—The immediate cause of this disease, is a poison of a peculiar kind, communicable by contagion.

II.—This poison first takes possession of the mucous membrane lining the fauces and the nose, and either by its action upon the secretory glands, or upon the mucus itself, assimilates that mucus to its own nature.

III.—That it is from this beginning, and from this only, that it spreads to the stomach, &c. and at length acts upon the system at large.

IV.—That its first action upon the living principle is that of a sedative or debilitating power.

V.—That, in consequence of certain laws of the nervous system, when the debilitating effects operate upon the *Sensorium commune*, a re-action takes place; and that this re-action is, *cæteris paribus*, proportioned to the debilitating power; except where the latter is sufficiently violent in its onset to subdue, at once, the living principle.

VI.—That, in consequence of this re-action of the nervous system, the vibratory motion of the capillary blood-vessels dependant thereon, is greatly increased, an unusually large quantity of blood is accumulated in those vessels; the heart and large arteries are deprived of their customary proportion; and hence, though stimulated to more frequent contraction, the pulse must necessarily be feeble.

VII.—Violent exertions are followed by debility. Upon the cessation of the fever, the capillary vessels, which had acted with such unusual violence, are left in a state of extreme debility, and are long in recovering their tone; hence it may be that so many patients afterwards become anasarcous. But when we recollect that some patients had these dropsical swellings, without any evident previous affection of the skin, we may be induced to look also for some disorder in the system of lymphatic absorbents.

If these positions are true, they will enable us to direct our practice with a tolerable degree of certainty; they will point out the way to further improvements, and they will assist us in judging of the probable success of methods which have been advised, but which we have not dared to adopt. Of this kind is

BLOOD-LETTING.

Plenciz and Navier advise us to use the lancet: the former in more general practice, but the latter confines it to cases wherein the inflammatory symptoms run very high.* He directs to bleed in the arm, but in case of delirium or coma, to open the jugular vein.

Our own countryman, Morton, says, we should not bleed without evident reason; and Dr. Cotton remarks, that "However the inflammatory disposition of the blood might seemingly call for bleeding, the untoward symptoms above mentioned seemed either to forbid this discharge, or to permit in such small quantities, that little service could reasonably be expected from it. And in fact I found that bleeding, though recourse was had to it at the beginning, was very little beneficial towards the cure of the fever, though often serviceable to the inflamed throat."

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* Venesectio interdum ob vehementiam inflammationis summe necessaria est. Præfert vero venesectionem in brachio, illam enim in pede institutam, varia sæpius exceperunt incommoda, in primis si viscera, quod sæpissime fieri asserit, inflammatione quodam affecta fuerunt. In delirio vero vel comate, jugularem quoque secare curavit. Navier, Comment. de rebus, &c. Pars. i. vol. iv. p. 340.

Indeed, such was the state of the pulse with us during the hot summer months, that I never saw an instance of blood being taken away: nor would it be easy to conceive with what view the boldest, or the most ignorant practitioner, would have dared to attempt it; for in those cases where the inflammation upon the surface was very great, the loss of blood could only contribute to the further depletion of the larger vessels, and thereby increase the debility and faintness which already existed in a most alarming degree; for the small vessels accumulating the blood, more in consequence of their own action than from the pulse of the heart, would not be affected by the usual mode of blood-letting; and the extent of the inflammation was much too great to allow us to have recourse to topical bleedings.

Sometimes where the fiery redness of the eyes, and the state of delirium seemed to demand the application of leeches to the temples, I have seen them applied; but never with any good effect. In one instance, towards the end of summer, where the constant rejection of every thing that was swallowed, even simple water, and the pain in the stomach during the efforts, seemed to indicate an inflammation in that organ, blood was taken away, notwithstanding the feebleness of the pulse. This blood was sizy. The bleeding was repeated; but no very evident advantage accrued to the patient. I think therefore we may conclude, that when the scarlet colour upon the skin is intense, we cannot expect benefit either from topical or general bleedings.

In the autumn, when the scarlet colour of the skin was seldom very intense, and often did not appear at all, the tumefaction of the fauces was generally much greater, and the pulse considerably more firm. In this case, if the patient was threatened with suffocation, if violent headach, or if peripneumonic symptoms pointed out the expediency of blood-letting, it was sometimes done; but still with less advantage than one would have expected; and similar symptoms in other patients were much more effectually relieved by

VOMITING.

It is very remarkable that neither Navier nor Plenciz, after having entered more particularly into the method of cure than any other writers, have never so much as mentioned the use of emetics; neither has Dr. Cotton, though he remarks that the disease generally began with sickness and purging. Our later writers, too, either pass over the use of emetics, or only mention giving a vomit at the commencement of the disease, as is customary in other febrile complaints, but without seeming to be aware that the speediness of the cure and the safety of the patient depend so much upon their early and repeated exhibition.*

Vomiting seems to be the remedy of nature: it stands foremost in her efforts to throw off the cause of the disease: it most amply fulfils the indications arising both from a consideration of the cause, and of the effects. If we want to dislodge a poison from the fauces, and the mucous membrane of the nose, and to prevent its descent to the stomach, how shall we do it so effectually as by emetics? If the poison already acting upon the nervous system, destroys the equilibrium of the circulating powers, how can we so readily restore that equilibrium as by emetics? Does not the experience of every day confirm their efficacy in a variety of disorders dependant upon local congestions?

But not to proceed further with questions which cannot fail to be answered in the affirmative, I will venture to assert, that the liberal use of emetics is the true foundation for successful practice in the Scarlet Fever and Sore Throat.

In the very first attack, a vomit seldom fails to remove the disease at once—if the poison has begun to exert its effects upon the nervous system, emetics stop its further progress, and the patients quickly recover. If it has proceeded still further, and occasioned that amazing action in the capillaries, which exists when the scarlet colour of the skin takes place, vomiting never fails to procure a respite to the anxiety, the faintness, and the delirium.

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* I have lately been informed that the physicians in Germany have now very generally adopted the practice of giving powerful and repeated vomits.

In autumn, when the throat was more affected; when the tumefaction of the fauces was such, that the patients could not swallow but with the utmost difficulty; when the peripneumonic symptoms threatened suffocation, and bleeding was ineffectual, an emetic opened the gullet, and unloaded the lungs, so that deglutition became easy, and respiration free.

But it is necessary to add, that a vomit only sufficiently strong to evacuate the contents of the stomach, is by no means adequate to these effects. The vomit must be powerful, and in ordinary cases repeated once in forty-eight hours. In those with more urgent symptoms, daily; and in the worst cases twice or thrice in twenty-four hours. The patients never fail to express the relief they find after the operation, and the physician soon discovers it in the countenance and in the pulse. As to the form of the emetic, the practitioner may vary it as he pleases; but I generally combine *tartar emetic* in solution with *ipecacuanha* in powder, that I may be more certain of their full effect on the stomach, and avoid the danger of their acting as a purgative. I also give them in much larger doses than usual, in order to secure a certain violence of action upon the system.*

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* In the true quinsy, or *angina inflammatoria,* I have used

PURGING.

I consider the action of purgatives as altogether repugnant to the curative indications in this disease. If the poison be received into the system in the manner I suspect, the operation of a purge, instead of discharging it, can only promote its diffusion along the alimentary canal;—but, waving that consideration, let us inquire what benefit can be expected from purgatives. Their most obvious operation is the emptying of the intestines, and thereby lessening the tension of the abdominal muscles. But we have shown that the anxiety, the debility, the faintness, are, in a great measure,

emetics for many years past with the greatest success. If a vomit be given the first or second day of the disease, and the patient kept in bed a few hours afterwards, drinking gruel freely, and taking tartar emetic in smaller doses to promote perspiration, he rises perfectly cured. If the inflammation has proceeded to such a length as to prevent deglutition altogether, a little tartar emetic repeatedly put far back upon the tongue, and suffered to dissolve there, will in time excite a vomiting. After the first discharge from the stomach, the patient will be able to swallow a large draught of gruel, and thus to continue the operation. The most urgent symptoms are instantaneously relieved, and in a day or two, sometimes with, and sometimes without repeating the emetic, the cure is effected. If the inflammatory process has so far been suffered to proceed, that matter is already formed; vomiting promotes the rupture of the abscess, and dispels the surrounding inflammation. There may be cases in which bleeding is absolutely necessary, but I never yet have met with them; nor do I find it necessary to direct any other medicine either internal or external, except an injected gargle to promote the discharge of the viscid mucus.

owing to the want of fulness in the larger blood-vessels; and a want of pressure upon them will produce the same effects. Hence the necessity of bandage when we hastily remove the water in an ascites. Through the whole course of the disease, the belly is in general very regular in its discharges; but if a purging spontaneously supervene the patients sink so amazingly fast, that it is not within the reach of art to support them. I have known a person so little indisposed, as to dine below stairs one day, and yet, upon a purging supervening, to die before the next day noon. Sauvage, after a vomit, advises purges; but he adds, that the patients very often died: and Dr. Cotton says, " if the fever ran high and the body was very costive, I ordered an emollient clyster," —but adds, " that the observations made on bleeding, held true likewise here; for the usual weakness of the patient, and depression of spirits, seemed to hint that these intestinal discharges were the less necessary."

SUDORIFICS. CORDIALS. ALEXIPHARMICS.

The medicines generally signified by these denominations have but little to do in the cure of the *Scarlatina anginosa*. The patients are not disposed to sweat when the scarlet colour prevails upon the skin, nor do I know of any safe method by which we could attempt to excite a diaphoresis, even if we should expect it to be advantageous. Under the autumnal appearance, when the skin had none of the scarlet colour, a warm bed and warm diluents would easily induce a moisture upon it; but I never saw any very evident advantage to be the consequence.

CORDIALS

Seem to be indicated by the great loss of strength and the feeble pulse; but they who are aware of the true cause of this debility, will not readily be induced to give them. I have known them given; but the certain consequence was an increase of the restlessness, of the delirium, and of the heat. MORTON advises the mild alexipharmics, by which he means distilled waters and compound powder of contrayerva. Having observed the mild and gentle stimulating effects of the contrayerva to be particularly grateful to the fauces, I have in many instances used it, and mostly in conjunction with testaceous powders, which sit easy on the stomach, and counteract the tendency to purging; the *camphor* julep too, gives nearly the same pleasing sensation to the throat.

DIURETICS.

This also is a mode of relief altogether unnoticed by writers on this disease; and yet, next to emetics, is the most to be depended upon in its cure. Some of the first cases I saw were cases of the most fatal tendency. Amongst other remedies I gave the *seneka root*, and frequently with advantage. But I soon had occasion to remark, that it procured relief only when it occasioned a copious flow of urine. This led me to the trial of other diuretics: but out of the numerous articles which are enumerated under that title, the selection was difficult. *Vegetable acids* were neither pleasing to the palate nor grateful to the stomach, and their effects upon the bowels made me fear to use them. The *vitriolic acid* bade fair to assist us in several points of view, but upon repeated trials it frequently deceived my expectations, though in a few cases it was grateful to the patient, and acted freely as a diuretic. *Neutral salts* did no better; indeed, I did not venture to push them far, after observing that the common *saline draught* was but too apt to purge; and even in those cases where it could be used freely without that effect, the patients never seemed the better for it. The acrid vegetable diuretics, such as *squills,* were likely to be too offensive to the stomach. In this situation it was, that some analogous reasonings, confirmed by the experience of a very sensible apothecary to whom I mentioned the subject, first directed me to the use of the *vegetable fixed alkali.* Of this I contrive to give a small quantity in almost every thing the patient drinks, so as to get down one or two drams every twenty-four hours. The *volatile alkali* may likewise be given with advantage, but it is difficult to get a sufficient quantity of it swallowed. Tincture of Cantharides was often given with the best effects, to the amount of one hundred and fifty, or two hundred drops in twenty-four hours.

ANTISEPTICS.

Acids have been noticed under the article of diuretics, and wine is included under that of cordials; therefore we proceed to the consideration of *Peruvian bark*, *fixable air*, and the *dulcified mineral acids.*

No medicine ever had a fairer or fuller trial in any disease, than the bark had in our epidemic. At its commencement, the great prostration of strength, the feeble pulse, and the sharp heat upon the skin, with here and there a livid spot, were thought to be such undeniable evidences of the putrid tendency of the disease, and of the broken texture of the blood, that the bark was poured down with a most unsparing hand. And again in the autumn the increased disease in the throat, and the sloughed appearance of the tonsils, conspired to keep up the delusion. It was very generally believed that bark was the only medicine that could be depended upon; and men had not yet forgotten, how many lives were lost in the first attacks of the ulcerated Sore Throat, until Dr. Fothergill and Dr. Wall taught us to withhold the lancet and the purge, and to depend upon cordials and bark.

We have already remarked that it is not an easy matter to distinguish between the Ulcerated Sore Throat, and the Scarlet Fever and Sore Throat, notwithstanding the two diseases require such a very different mode of treatment.

The heat of the skin, the prostration of strength, and the feeble pulse have been considered before;

it remains to observe, relative to the livid spots and the sloughed tonsils, that the former only appeared where the cutaneous inflammation ran to its highest state, and were most probably owing to the effused contents of a ruptured capillary blood-vessel: the latter were likewise the consequence of a very high degree of inflammation, which was often kept up by an improper use of the bark and cordials. In some instances the inflammation attendant upon the disease was in itself sufficient to produce the sloughs, but they were generally the consequence of negligent or improper management; for if the patient, from the beginning, be treated upon the plan I have advised, the sloughs either never appear, or, if they do appear, they never increase; and in twenty-four hours vanish altogether. But when that inflammation was still further augmented by large and frequent doses of bark, it was astonishing to see how much the tumefaction increased, and how rapidly the whole lining of the fauces was converted into a stinking slough. It is true, nevertheless, that many patients recovered who took bark. The fact seems to be, that in mild cases, an improper mode of treatment is not highly detrimental; it is only in the more dangerous states of the disease that we can do much good or much harm. And I am ready to confess that in two or three of the first bad cases I saw, misled by so many marks of putrescency, I gave the bark, but the consequences were not such as could justify a continuation of its use.

Plenciz* takes a good deal of pains to persuade us to the use of the bark; notwithstanding his general plan is that of the antiphlogistic kind; but he says that bleeding ought to be premised. At the end of his book he gives us seventeen histories, six of which seem to be instances of the simple Scarlet Fever of Sydenham; two of the dropsy consequent to our epidemic, and nine of true epidemic fever. To only one of these he gave the bark, and that patient died. Morton met with some cases in which the fever intermitted, and then the bark was thrown in successfully.

Finding that no advantage was to be expected from the bark, recourse was had to *fixable air*, which I had often used in fevers where circumstances forbade the use of bark; its sedative and antiseptic properties were well established, and I expected to turn them to good account. But I was not at that time sufficiently acquainted with the nature of the disease. Fixable air therefore was used, but it seemed to do neither good nor harm.

The dulcified mineral acids in small quantities produced no advantage; given more freely they increased the heat and inflammation. Bottled small beer and cyder were frequently asked for by the patients, and the first or second time swallowed with great avidity; but they soon disliked them, and even the attendants could not fail to remark the increase of heat and restlessness that they occasioned.

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* Tract. de Scarlatina, p. 103.

OPIATES.

In case of great inquietude and restlessness, both Navier and Plenciz advise to give opium in small doses; but I never saw it effect the purpose for which it was given; on the contrary it visibly increased the distress of the patient. The experience of Dr. Cotton confirms my observations, for he tells us that "Opiates had no beneficial influences to remove watchfulness—not even when the fever was in a great part or altogether gone off."

BLISTERS,

In the summer appearance of the disease, were universally detrimental; they never failed to hasten the delirium, and if the case was one of the worst kind, they too often confirmed its fatal tendency. But when the pulse was so feeble that the nicest finger could hardly count its strokes for a quarter of a minute together; when the oppression and anxiety of the patient was such as words can but ill describe; when the physician expected that a few hours more would annihilate a life already sunk to so low an ebb, and when the friends would perhaps censure him if he forbore to try the efficacy of an application so universally, and I may add, indiscriminately used;

it was not easy to resist their importunities under such pressing and distressful circumstances.

But to avoid a detail that would carry me too great a length, suffice it to say, that after frequent opportunities of observing the events of cases in other respects similar, the blistered patients very often died, whilst those who were not blistered never failed to recover, if properly treated in other respects. In the time of our immediate predecessors, a fever and a blister seemed to be almost inseparable ideas; accordingly we find Dr. Cotton prescribing them very freely, yet he confesses "That oftentimes no good effect accrued hereby to the fever,"—and that "A few who had blisters timely applied, and nevertheless a subsequent delirium was not prevented." But it is easy to see, from the whole of what he says on this subject, that he applied them rather to avoid the imputation of imprudence, than from any good he observed to attend their use.

In the autumnal season, when the inflammation was less generally diffused through the body, blisters were less detrimental. If the brain was affected soon after the attack, they did much mischief even then; but if the inflammation was pretty much confined to the fauces, a blister was frequently applied round the throat, though with less advantage than the practice in quinsies and other local inflammations would teach one to expect.

GARGLES.

In the summer the affection of the throat was frequently so trifling as not to demand any particular attention; but when the inflammation and swelling in the fauces became a principal cause of complaint, the use of gargles was very grateful to the patient. A decoction of contrayerva sweetened with oxymel of squills, was what I have most frequently used; sometimes barley water acidulated with the marine acid; and sometimes the tincture of roses. When these gargles were pretty forcibly injected by means of a large pewter syringe, with a long pipe to reach over the tongue, it was amazing to see the quantity of viscid ropy stuff that was discharged, both from the fauces and nostrils. When there is a great disposition to the formation of sloughs in the throat, Navier advises* to gargle with a mixture of highly rectified spirits of wine camphorated, and oxymel; which, he says, never fails to stop the progress of the gangrene. I am inclined to believe it is a good application, but have never had occasion to try it. After the fever abates, Sauvage uses a gargle of lime-water sweetened with honey.

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* - - - - - Progressum vero hujus internæ gangrenæ quam certissime impedit gargarisma ex oxymelle cum adjecto spirita vini camphorato, qui vero Hoffmanni methodo sala alcali præparatus esse debet, ne aquosis mixtus lactescat. Navier, in loc. citat.

POULTICES.

Cataplasms of different kinds were applied round the neck, but I cannot add with any particular advantage. Upon the whole, I think, the less additional covering was made to the throat the better.

WARM BATHING.

The immersion of the feet and legs in warm water, though sufficient to procure sleep and abate delirium in several kinds of fever, was not attended with any such desirable effects in this; nor did I ever perceive it to do harm. In cold weather, when there was no inflammation upon the skin, and the legs and feet were cold, it rendered the patient more comfortable; and I am much inclined to believe that in the greatest degree of efflorescence which existed in the summer months the use of a tepid bath would have been productive of the happiest effects: but this is a matter of opinion only.

TEMPERATURE.

In the heat of summer it was hardly possible to keep the patients sufficiently cool. A mattress to lie upon was found preferable to a feather-bed, with the lightest covering for the body, and a free circulation of air. Patients that could sit up, were allowed only to lie down occasionally, and those whose strength would admit of it, were ordered frequently out of doors. This method a little modified, did very well through the warmer part of autumn; but when the winter cold took place, it was necessary to keep them more in bed and in a room moderately warmed. In two families, which I was desired to visit in the year 1790, the doors and windows had been anxiously kept open in very cold weather, thin bed-clothes directed, and fires prohibited. Both children and adults who were seized by the infection had the disease in its worst forms, though in other respects the treatment had not been much amiss. Some of the children died, nor did the exposure to cold and wind prevent the spread of the infection. From the time that moderate warmth was allowed, things took a more favourable turn, the sick recovered and the healthy remained well.

But it is not only during the existence of the feverish symptoms that the patient should be kept in a temperate warmth, the convalescent state demands also an attention to this point. Too much exposure to cold air prolongs the debility of the patient, often giving rise to other subsequent disorders. I have observed the same things to happen after the measles, when exposure to cold air has been enjoined or allowed. It is obvious that this error must have arisen from the good effects of free exposure in the small-pox; but experience having demonstrated the mistaken analogy, a further perseverance must be held inexcusable.

DIET.

Those who were only slightly indisposed were kept pretty much from animal food and fermented liquors. Those in a worse situation were allowed tea, coffee, chocolate, milk and water, gruel, barley-water, &c. and occasionally, weak wine whey, or nitre whey. But nothing was more acceptable than a full draught of water fresh drawn from the spring. In this the patients were indulged during every exacerbation of heat, restlessness, or delirium, and it seldom failed to procure a temporary abatement of these distressing symptoms.* Of late years I have freely allowed animal food when the patients feel an inclination for it. They generally wish to have cold meat, and I have been surprised to see with what pleasure they would eat cold chicken, at a time when the degree of fever and sore throat would make one suppose that the one would preclude the inclination, and the other the power of taking such kind of diet.

When the fever ceased, I generally gave a dose of calomel, and worked it off the next day with Rochelle salts, or some other mild purgative. If the nights were still passed with watchfulness, opiates were directed; and in the day-time bark, with small doses of salt of steel. If the debility was considerable, wine was allowed rather liberally; but nothing afforded such immediate relief as the application of blisters.

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* See the preceding note on the good effect of cold water externally applied.

Treatment in the Dropsical State.

Whether the anasarcous appearances are necessary consequences of the Scarlet Fever and Sore Throat, in bodies particularly predisposed to become dropsical; or whether they are the result of negligent or improper management; whether they depend upon the languid action consequent to the great excitation of the subcutaneous vessels, or whether they are to be attributed to the lymphatic absorbents being affected by the poison of the disease, I will not take upon me to determine: but it may be worth observation, that I have rarely met with an instance of a patient becoming dropsical, who had been treated, during the fever, according to the method advised in the preceding pages.

When called upon to visit patients in this situation, I commonly began with giving calomel at night, and a mild purgative in the morning.

If a febrile pulse attended the other symptoms, an emetic was useful; as were also the saline draughts and other neutral diuretic salts. In cases of great debility, with comatose, or peripneumonic symptoms, large and repeated blisters were of infinite service: but in the more common cases, when the dropsical symptoms were the principal cause of complaint, small doses of calomel and rhubarb occasionally, to keep the bowels open; dilute solutions of fixed alkali; squills; Seltzer water; and other diuretics in daily use, were adapted to the disposition and temperament of the patient. In some cases that resisted the usual remedies, a single grain of Pulv. fol. Digitalis given twice, or at most thrice a day, until its effects became evident, soon effected a cure in a manner highly pleasing to the patient, for it is never necessary to push its doses so far as to occasion nausea, or to produce any other kind of disorder in the system. When the urine flowed freely, steel and other tonics were employed; and the recovery was greatly promoted by gentle exercise, high seasoned food, wine, and the wearing of flannel in contact with the skin.

I cannot conclude this subject without noticing a remedy strongly recommended by Plenciz;* but not having had occasion to try it, the reader must depend upon his account of it.

R. Rhei electi
Spiritus salis coagulati *aa* drachmas duas
Mercurii dulcis
Auri fulminantis
Extracti scillæ *aa* drachmam dimidiam m. fiant. pilul.
c. rob. juniperi, pondere unius alteriusve grani.

In the exhibition of this medicine the following precautions are to be observed.

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* Tractatus de Scarlatina, p. 121.

Firstly.[*]—One or two of these pills are to be given every second or third hour; according to the age and strength of the patient. This quantity ought to procure three or four stools every day: but if it fail to do that, either the dose must be increased, or some purgative, such as extract of jalap, sulphurated scammony, or aloetic pill with scammony, must be added: by this means a salivation will be prevented. But

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[*] *Primo.*—Quod una alterave harum pilularum omni bihorio, aut trihorio, pro diversa ætatis aliorumque circumstantiarum, ratione exhiberi, debeat, quam dosim tres quatuorve sedes quotidie sequi debent, quæ si non succedant, tunc vel earum dosis augeri debet, vel prædictis pilulis magisterium mecoacanæ, aut diagridium sulphuratum, aut pilulæ Cochiæ addi possunt. Qua ratione dein salivatio impedietur. Quare,

Secundo.—Ut eo certius salivatio impediatur; debet æger post assumptas pilulas bibere calide aliquot uncias infusi baccarum juniperi, aut decocti radicum graminis. Item.

Tertio.—Postquam bidui aut tridui his pilulis usus fuerit, debet ab earum usu una, alterove die abstinere.

Quarto.—Si ab usu hujus remedii nimiæ turbæ in corpore concitari videantur, poterunt tales sopiri remediis paregoricis.

Tandem si in his, aliisque similibus affectibus notabilis febris adsit, debemus ab usu hujus remedii abstinere, quia timendum est, ne exinde febris augeatur. - - - - - - - - - - - - - - - - - - ab usu prædicti remedii intra unam alteramve diem ingens copia seri, tam per urinas quam per alvum evacuari solet. - - - - - - - - - - - - Adeoque non tantum in cachexia leucophlegmatia, et hydrope, sed et in contumacissima alvi et urinæ obstructione, si inflammatio aberat, illud in usum vocabatur.

Item, In catarrho suffocativo, in asthmate humoroso, ubi chermes minerale, sulphur antimonii tartarisatum, scilla, gummi ammoniacum, aliaque, alias efficacissima remedia, inertio erant, aurum fulminans cum uno alterove grano mercurii dulcis, præsentaneum erat remedium. Plenciz Tractatus iii. p. 124.

Secondly.—The more effectually to prevent a salivation, the patient after each dose of the pills ought to drink some ounces of tea prepared with juniper berries, or a decoction of grass roots, warm.

Thirdly.—After taking these pills for two or three days, they must be omitted a day or two.

Fourthly.—If the use of this medicine occasion too much disturbance in the habit, opiates will be proper, and if much feverish disposition prevails it must not be employed. - - - - - - - - - - - - -
Within a day or two after the use of this remedy, there is generally a copious discharge of water both by urine and stool. - - - - - - - - - - - - -
It is not only in cachectic, leucophlegmatic, and dropsical cases that this remedy is useful: but in the most obstinate alvine and urinary obstructions; provided they are not accompanied with inflammation.

So likewise in the suffocating catarrh, and in the humoral asthma, where chermes mineral, tartarised sulphur of antimony, squill, gum ammoniac, and other, even the most powerful remedies, produce no good effect, the *aurum fulminans*, with a grain or two of calomel, affords an immediate relief.

He further adds that this medicine was a secret of Dr. Weber's, of Furnberg, who used it with great success in a variety of obstinate chronical diseases.

CASE I.

The summer appearance of the disease—The inutility of the bark at its commencement—Infection communicated.

A young lady 12 years of age, was suddenly seized in the evening with weariness, sickness, sore throat, and headach. A vomit was given the following day, and afterwards the bark. The third day, the nausea still continuing, and the strength being greatly impaired, the vomit was repeated, the bark continued, and port wine negus directed for common drink.

The fourth day at noon I first was called in, and found her delirious, with a considerable degree of stupor. Her eyes of a fiery redness, her lips parched, her skin universally tumefied, of a full scarlet colour, and almost intolerably hot. Her tongue dry; her throat the colour of her skin; her respiration quick, short, and sobbing; her pulse so rapid, so feeble, and so unsteady, as not to be counted.

I directed a vomit to be given immediately;* a large blister to be applied between the shoulders; an alkaline solution† to be put into a quart of white wine whey, and the whole to be taken in twenty-four hours.

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* R. Rad. Ipecac. gr. vi.
Tart. Emet. gr. i. M. f. pulv.

† R Sal. Absinthii ʒii.
— vol. Ammon. ʒß.
Aquæ fontan. ℥ii. M. f. solut.

Fifth day.—Her condition nearly the same. Had no stool; urine small in quantity. The alkaline solution was continued; four grains of seneka root were given every four hours, and ten grains of James's powder at night. The weather being very hot, the doors and windows of the room were constantly kept open, and as much cold water as she would drink was allowed every time she became more restless and delirious than usual.

Sixth day.—Urine more plentiful. Her pulse could now be counted pretty certainly at 140 strokes in a minute. She had one stool in the night. Two blisters were applied to her legs, and a spoonful or two of a vomiting mixture* directed to be taken every four hours, or so as to keep up a pretty constant nausea.

Seventh day.—Passed a better night. Pulse 125. Eyes less fiery; stupor abated, and she could answer sensibly to two or three successive questions. The vomiting mixture was repeated.

Eighth day.—Had some sound sleep for the first time. The heat and redness of the skin considerably abated. Pulse 90. Steady and sufficiently strong. Begins to call for food. As her belly had all along been rather costive, the following powder was directed.*

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* R. Tart. Emet. gr. iii.
Vini Ipecac. ʒvi.
Cretæ pp$^{t.}$ ʒii.
Aq. fontan. ℥vi.
Syr. e Cort. Aurant. ℥ß. M.

Ninth day.—The feverish symptoms entirely gone. The skin peeling off. Urine plentiful, and depositing a farinaceous sediment. The following powder was ordered to be taken thrice every day.†

In a few days she was carried out, and by the assistance of bark and steel soon recovered her accustomed health, but not without the loss of her hair.

REMARKS.

The imminent danger that this young lady appeared to be in, occasioned the blisters to be directed; and I had not at that time seen so much of the disease as could enable me to decide with precision against their use. Fortunately for the patient, they never rose at all. She was evidently better after every vomiting, and after each draught of cold water. She was very desirous one day of bottled perry: it was allowed her, diluted with water; but an increase of her restlessness, heat, and short breathing was so evident to those who had the care of her, that they soon refused to give it her. The fauces were never sloughed, nor much tumefied.—One of the nurses was soon afterwards seized with the same complaints, but by an early application of nearly the same remedies she presently recovered.

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* R. Sal. Polychrest. ʒß.
Rad. Rhei. ℈i.
Calomel. pp$^{t.}$ gr. iii. M. f. pulv. statim sumend.

† R. Cort. Peruv. subtiliss. pulv. ℈i.
Rad. Contrayerv. gr. x. M. f. p.

CASE II.

The efficacy of repeated vomits.

Mr. S———, a strong man, about 34 years of age, was seized with the usual symptoms of the worst kind of Scarlet Fever and Sore Throat. On the evening of the first day of the disease he called upon his apothecary, who gave him an emetic. The second day diuretics were prescribed, a gargle to his throat, a blister to his back; and in the evening the vomit was repeated. Vomiting being observed to be followed by a remission of the symptoms, he took two vomits upon the third day, and expressed himself relieved after each. Upon the fourth day I first saw him, and found him with a very quick feeble pulse, a skin universally scarlet and tumefied, exceedingly hot, breathing short, throat still sore, eyes red, great restlessness and delirium. A strong vomit was immediately prescribed, some powders composed of contrayerva and camphor,* and a diuretic solution.

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* R. Rad. Contrayerv. subt. pulv. gr. xv.
Camphor. gr. v. M. f. pulv. secundis vel tertiis horis sumend.

He passed a restless night, but the fever abated the following day, and ceased in a few hours afterwards; his skin peeled off, and in a short time he recovered perfectly.

REMARKS.

This was one of those cases in which the violence of the attack and the rapidity of the symptoms threatened the greatest danger. The alleviation of the distress of the patient after every vomit, was a proof of the propriety of that mode of treatment; but the quick recurrence of disagreeable symptoms argued the fatal tendency of the disease. The blister was not applied, and to the omission of that I attribute the safety of the patient; for where the violence of the inflammation can but barely be counterbalanced by the means we can command, the additional stimulus of a blister is surely sufficient to destroy the equilibrium.

CASE III.

Eruption of a livid colour—Watery vesications.

A boy fifteen years of age, at a boarding-school about six miles from this place, was seized,

R. Sal. Absinthii ʒii.
— vol. Ammon. ʒi.
Aquæ fontan. ℥i. f. solut. in lib. ii. Seri vinosi commiscend. et bibat æger liberaliter liquoris.

on Monday, the 26th of October, with giddiness, sickness, and vomiting. He continued to play with his school-fellows till the urgency of the sickness prevented him. He was cold and hot by fits; he was weary; he complained of headach, and a slight soreness in his throat.

Second day.—The symptoms continued, with the addition of prickling and itching in his skin, which turned red where he scratched it. This day he took an emetic by the advice of his apothecary.

Third day.—He was brought in a chaise to Birmingham.

Fourth day.—I saw him, when he complained of great headach, sickness at times, and unusual weariness. The whole of his skin was of a deep violet colour tending towards blackness. His tongue moist, of a whitish brown. Lips dry and parched. Throat nearly the colour of his skin, tumefied but not ulcerated or sloughed. Eyes pretty clear. Flesh not very hot. Pulse 120, moderately strong. He was ordered to take two spoonfuls of the vomiting mixture* every half hour, and afterwards an ounce of the decoction† every two hours. Cold water was allowed when he called for it, likewise gruel, and weak wine whey.

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* R. Vini Ipecac. ℥i.
Tart. Emetic. gr. vi.
Aquæ fontan. ℥vii. M.

† R. Rad. Senekæ non contusi ℥i. coque ex aquæ fontan. ℔iii. ad ℔i. et colat. adde
Succ. Glycyrr. ℈ii.
Sal. Absinthii ʒiß. M

Fifth day.—The vomit worked him a good deal, and he was somewhat relieved. In the beginning of the night he was restless, but got some sleep towards morning. He had made plenty of urine, but it smelt so strong that the nurse had it thrown away. A little redness was now visible in his eyes towards the outer corners. Pulse soft; more steady than yesterday, 108. Lips not so dry. Throat less tumefied; its colour, as well as that of the skin, less intense. Had a small costive stool this morning.—*Repeat the vomit this evening, and continue the decoction.*

Sixth day.—Passed a good night. Urine in good quantity, less offensive to the smell, and its appearance nearly that of a healthy state. Throat quite well. Pulse 68, firm. Skin changing to a brown colour. Appetite returning. Fifteen grains of rhubarb, and three of calomel were given this night at bed-time.

Eighth day.—Continued free from complaints: slept well; eat well. Pulse 65. This morning, white blisters appeared upon several parts of his hands and fingers, which when cut discharged a small quantity of clear water.

REMARKS.

The livid colour of the skin was thought in this case to indicate the highest degree of putrescency, and the most imminent danger to the patient: but I had learnt long before this, to believe, that the disease had nothing putrid in its nature; and when I considered the favourable appearance of the eyes, and the moderate velocity of the pulse, I could not coincide with the opinions that had been formed of the event. The white blisters have been mentioned by Dr. Plenciz, but he believes they never contain any fluid, and having frequently found that to be the case, I subscribed to his opinion; but as the blisters in this patient were filled with a watery fluid, it is probable they were so in others, only we did not happen to examine them until the fluid had been absorbed or evacuated.

CASE IV.

Inefficacy of bark and blisters—Dropsical symptoms.

A young lady, near seven years of age, was seized on Friday, the 30th of October, with the usual symptoms of the Scarlatina anginosa. The scarlet colour appeared upon the skin on the Sunday following, and began to vanish again on Tuesday without any succeeding desquamation. She continued much indisposed until Thursday, the 12th of November, when I was first desired to visit her.

Fourteenth day.—I found her in a considerably sleepy state; much averse to being stirred. Her breathing difficult and rattling, particularly when lying down, for which reason she was generally kept upon the lap. Her skin dry; flesh not very hot; pulse 136 in a minute. Tongue dry, and brown in the middle; skin of her lips black and ragged. She was universally bloated, but her legs most so towards night. Her fauces appeared tumefied, and by the assistance of an injected gargle she threw up viscid mucus. Urine small in quantity, appetite altogether wanting.

She was directed to take four grains of James's powder, and to repeat the dose every hour for three times; afterwards two spoonfuls of a diuretic solution[*] were given every second or third hour.

Fifteenth day.—But little alteration.—*Continue the medicines.*

Sixteenth day.—Pulse 130. Urine more plentiful. In other respects nearly the same.[†] Six grains of fossil alkali purified, were directed to be taken in solution every four hours, and a gargle with oxymel of squills frequently injected into the throat.

Seventeenth day.—Tongue clearer. In other respects but little alteration.

Eighteenth day.—Discharges a great quantity of viscid, white, opake stuff from her throat and nostrils. Tongue quite clean. Flesh not hot. Belly regular. Swelling something abated. Complains of great soreness in her wrists and ankles. Pulse still 130. She was directed to drink freely of Seltzer water.

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[*] R. Sal. Diuret. ʒiii.
Sacch. alb. ʒii ß.
Sp$^{t.}$ Lav. Comp. ʒ ß.
Aq. hordeat. ℥ vi. M.

[†] Calomel. pp$^{t.}$ gr. iii.
Pulv. Test. Ostr. gr. vi. M. f. p. statim sumend.

Nineteenth day.—Had a better night. Pulse 120. Went out in a chaise, and seemed refreshed by it. The sleepiness and swelling abated.

Twentieth day.—Passed a good night. Pulse now only 108, and much firmer. Urine plentiful and depositing a copious lateritious sediment. Soreness of her limbs, and swelling of her legs considerably decreased. The bark was now directed, Seltzer water for her common drink, and daily exercise in a chariot.

Twenty-first day.—Has had a very good night. Makes more water than ever. Appetite begins to return.

Twenty-second day.—Pulse 96. Stood alone to day for the first time.

Twenty-fourth day.—Appetite very good. Pulse 84. Strong enough to walk about the room. Skin peeling off.—From this time her further recovery was rapid and uninterrupted.

REMARKS.

This young lady was first taken ill at a boarding-school some distance from Birmingham, so that I had no opportunity of knowing how she was treated in the beginning, but when I first saw her she was taking bark medicines. Her elder sister fell a victim to the same disease a short time before, and she, I understood, took bark and was blistered. A younger sister was taken ill upon Tuesday, the 10th of November. The third, fourth, and fifth day, she took a strong vomit; was allowed to drink freely of Seltzer water. Vomits were afterwards given every other day, to promote the discharge of mucus from the throat and nostrils, and thus the cure was effected without the assistance of any other medicine.

CASE V.

Pain in the limbs—Great soreness—Strong tendency to delirium.

Mr. M———, 20 years of age, was seized, in the evening of the 15th of November, with slight alternating heats and colds. Passed a very restless night, hardly sleeping five minutes at a time. The next morning he felt his throat sore; complained of sickness; great pain in his head, back, and limbs. Still hot and cold by fits. The third day his skin began to turn red, and he could not rest a minute for the troublesome itching and pricking all over him.

Fourth day.—I first saw him. His skin was now universally scarlet and intensely hot. His eyes red; his tongue white, except at the end and at the edges. His fauces of a full scarlet colour and tumefied, but without any appearance of sloughs or ulcers. He complained of thirst, and was frequently sick; his pulse 120; small, but not very feeble. He was exceedingly restless, and delirious whenever he closed his eyes. He had taken one vomit, also powders of seneka and contrayerva, and a solution of salt of wormwood. These medicines were ordered to be continued, and a stronger vomit given at night.

Fifth day.—He vomited much, and afterwards had two purging stools. Has had a bad night from restlessness and painful soreness in all his limbs, which still continues. Throat less sore and less tumefied. Scarlet colour of the skin nearly the same; but on the inside of the wrists there are a few very minute pustules with white heads, visible through a magnifying glass. Head easy; eyes not impatient of the light. Inclined to sickness when he swallows any thing. Urine plentiful, of a natural colour, with a light mucous cloud floating in it. He was ordered to drink gruel, tea, and cold water. To take a powder* every four hours, and a wine glass full of solution† at the intermediate times.

Sixth day.—Passed a restless night, and somewhat delirious. Inclination to sickness ceased. Urine very plentiful. The scarlet colour on the upper part of his body less intense: that on his legs and thighs the same. Pulse 108. Complains chiefly of soreness all over him, but says he is much better—*Let the same medicine be continued.*

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* R. Rad. Contrayerv. gr. v.
Test. Ostr. pp$^{t.}$ ℈ ß. M. f. pulv.

† R. Sal. Sodæ, ℈ ii.
Extr. Glycyrr. ℈ i.
Aq. fontan.
— Menth. vulg. simpl. *aa* ℥ iii ß.
— Cinnam. Sp$^{t.}$ ℥ i. M.

Seventh day.—Little or no sleep in the night, having been teazed with the appearances of strange images the moment he closed his eyes. Scarlet colour turning brown. Great soreness about his neck and shoulders, but in other respects much better; and able to sit up several times to day. Pulse 98. He was ordered to take a purging bolus* at bed-time, his usual medicines the following day, and a composing draught† at night.

Ninth day.—The purge worked moderately. Passed the night comfortably. Skin universally brown. Pulse 94. Eyes watery and impatient of the light. Soreness partly gone. Appetite returning. The composing draught to be given again at night, and the next morning to begin with the tincture of bark and Virginia snake root.

Eleventh day.—Appetite good. Pulse 80. Eyes less tender. Skin peeling off. Tongue very sore, but nothing remarkable to be seen upon

* R. Rad. Rhei. gr. xii.
Calomel, pp$^{t.}$ gr. vi.
Cons. Rosar. ℈i.
Syrup. ut. f. Bol.

† R. Syrup. e Mecon. ʒii.
Tinct. Thebaic. gutt. xv.
Aquæ Menth. vulg. simpl.
—— fontan. *aa* ʒvi. M.

it.—From this time he continued mending daily, and was soon restored to health.

CASE VI.

Autumnal appearance—Sloughs and great tumefaction in the throat—Bark detrimental.

Mrs.———, a married lady, about 35 years of age, felt a sensation of rawness in her throat on Friday evening, the 20th of November; but passed a good night. The next morning she was chilly and weary, with an aching all over her. These symptoms continued till eight at night, when she became very hot, and continued so until Sunday morning. The soreness in her throat was still but trifling. The preceding night she had taken five grains of James's powder, which excited a pretty copious perspiration. She continued very much indisposed all Sunday, the feverish symptoms ran high, and a blister was applied on the right side of her neck. On Monday the feverish symptoms continued nearly the same: the left side of the fauces being now as much affected as the other, a blister was applied also to that side of the throat. Some white specks, which had appeared in the throat before, were now increased so as to spread over both tonsils, and the back of the fauces. In this situation I was desired to visit her. I found her labouring under great anxiety; her countenance pale, her respiration difficult, her voice inarticulate, her pulse 130, rather irregular, but not very feeble. She had passed the night with such oppressive feelings about her chest and stomach that she durst not attempt to sleep, and her deglutition was now so much impaired, and the attempt so extremely painful, that nothing less than the greatest degree of fortitude could enable her to swallow. She had hitherto taken bark freely, but it purged her; small doses of laudanum were then added to prevent that effect, and the bark was continued to the amount of a dram of the powder every four hours, and two ounces of strong decoction with tincture in the intermediate times. When it was impossible to swallow any more bark, cordial draughts composed of confectio cardiaca and volatile salt were directed. She had felt her oppression and distress increase after every dose of the bark; but filled with the idea of her disease being putrid, and that nothing but the bark could stop the progress of the gangrenous sloughs, she had persevered with unusual assiduity in the method prescribed.

I immediately ordered a vomit* which cost her very great exertion to get down. It acted in a short time, and she was sensibly relieved. When the sickness abated she took half one of the cor-

* R. Tart. Emet. gr. ii.
Vini Ipecac. ℥i.
Aquæ fontan. ℥vi.
Acet. Scillit. ʒii. M.

dial draughts that was in readiness; afterwards a powder[*] every two hours, and used the gargle[†] very frequently with the assistance of a syringe.

Fifth day.—Slept very comfortably for four hours in the night. The great oppression and anxiety removed. The sloughs in the fauces beginning to separate at the edges; her voice still inarticulate, and the act of deglutition considerably painful, but not so much so as to prevent her getting down her medicines and a sufficiency of liquid nourishment. Pulse 120.

From this time she continued mending. On the seventh day she was universally better, and slept very comfortably. On the eighth day she took solid food for her dinner; and on the ninth the sloughs in her throat were all cleared away. In the beginning of this disease her urine was small in quantity, but as she grew better it became very considerable. The syringing occasioned very great quantities of viscid mucus to be discharged from her throat and nostrils. Through the whole course of the disease she had a great tendency to delirium, whenever she attempted to sleep. As she recovered, her skin peeled off; and she was tormented for some days with a great soreness of her tongue.

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[*] R. Rad. Senek. subt. pulv. gr. v.
—— Contr. pulv. gr.vii.
Cretæ pp^{t}. ℈ ß. M. f. pulv.

[†] R. Rad. Contrayerv. ℥ ß.
Aquæ fontan. ℥ xii. coque ad
℥ viii. et colat. adde
Oxymel. Scillit. ℥ ß.
Sal Absinth. ℈ i. M.

REMARKS.

The tendency to the formation of gangrenous sloughs in the throat, seems to be nearly proportioned to the violence of the inflammation. If this inflammation is increased by improper treatment, formed upon the idea of the disease being putrid, the consequences are a rapid increase of the inflammation and the gangrene. But if emetics are exhibited at first, and occasionally repeated, I never see the sloughs continue for twenty-four hours. It is observable, that in this case the desquamation of the skin took place, notwithstanding there was neither eruption nor discoloration at any time of the disease.

A

CHYMICAL ANALYSIS

OF THE

WATERS AT CALDAS DA RAINHA.

Caldas is a pleasant little town, about twelve leagues north of Lisbon; the road from Lisbon is good, the place itself enjoys a fine air as well as the advantages of a fine country round it, but its principal celebrity is derived from its hot medicinal springs, which have been long in high estimation for the cure of various chronic diseases. The springs are enclosed in a handsome stone building, connected with a noble hospital on a royal foundation, for the reception and accommodation of the sick poor, who are annually sent there from Lisbon during the summer season.

Besides the well at which the water is drank there are four baths, in as many separate apartments, three of which are supplied with springs;

but the influx of water is greatest in that which is called the men's bath, though the baths themselves are nearly of a size. It appeared to me that there was no material difference between the water of the men's and that of the women's bath, but the temperature of the latter is something lower, partly on account of the air of the room being less confined, and partly from the less rapid influx of the water. The men's bath is about thirty-six feet long, nine wide, and about two feet eight inches deep in water, so that it contains, when filled in the usual manner, eight hundred and sixty-four cubic feet of water, and this quantity is supplied from the spring in little more than a quarter of an hour.

The bottom of the baths, as deep as I could examine, is a strong whitish clay; but this clay is covered to a considerable thickness with fine washed sand, which is a great convenience to the bathers, who sit down in the bath.

The waste water from these springs runs westward from the town, and at the distance of a few hundred yards below the baths it is received into a trough, which conducts it to an overshot mill-wheel. By measuring the space which the water occupies in this trough, and also by measuring the velocity of its current, it appears that the springs discharge not less than sixty cubic feet each minute, or three thousand six hundred cubic feet in an hour. From this statement it is evident that the principal sources of the water open into the men's bath; and on this account it was thought proper to use the water from that bath in the following experiments.

TEMPERATURE.

A very nice thermometer, made by Mr. Ramsden, to Fahrenheit's scale, showed the heat in the well from which the water is drank to be 91°; that of the men's bath 92°; but in the part of the same bath where the water springs up most rapidly, it rose to 93°. These observations were repeated on different days, and at different times of the day, without any perceptible variations.

ODOUR.

The sulphureous smell of the water is generally perceptible at some distance from the springs. It is nearly the smell of liver of sulphur, and is often compared to that of a foul gun-barrel. The intensity of this odour, and the distance at which it can be perceived, vary very much at different times; but this variation rather depends on circumstances affecting the circumambient atmosphere, than upon any changes in the water itself. After standing in an open vessel for twenty-four hours, the water still retained much of this smell, but the odour was entirely dissipated by boiling.

COLOUR.

The water taken up at the strong spring, in the men's bath, was perfectly transparent, and continued so for several hours after standing in a room at the temperature of 56°, only detaching some globules of air to the sides of the glass.

The water taken from the well was not so transparent.

TASTE.

Something analogous to the smell, but followed by a slight sensation of roughness on the palate.

DEPOSITIONS.

Bubbles of an elastic fluid are constantly thrown up through the water, from the bottom of the bath. It will appear hereafter that this aëriform fluid is chiefly hepatic air. This air is decomposed by the contact of the dephlogisticated air of the atmosphere, in part forming sulphur, which swims like a pellicle on the surface of the water, and subsides when the water is agitated. In this state, whilst yet moist, it is soft and rather unctuous to the touch; but when dried proves to be real sulphur. Quantities of this sulphur are deposited upon the Conferva, which grows in the course of the streams of waste water, and also upon dead sticks and other substances thrown into the stream.

The hepatic air likewise in part forms vitriolic acid, which corrodes the iron-work of the doors, locks, and window-bars, and uniting to the calcareous matter of the walls forms selenitic salt. Where the surface of the marble of the walls has already been converted into selenite, the vapour condenses, and, meeting with no calcareous matter to saturate it, retains its acid properties.

The particular odour mentioned above is also caused by some of this hepatic air not yet decomposed by the oxygen of the atmosphere; and the blackening of silver in buckles, &c. is owing to the same cause.

SPECIFIC GRAVITY.

A medical pound of the Caldas water was found to weigh seventeen grains more than the same bulk of distilled water, both being at the temperature of 60°. But the balance used on this occasion was not so nice as it should have been; so that I consider the above proportion as only an approximation to the truth.

ELASTIC FLUIDS.

(A) A quantity of air bubbles spontaneously issuing from the bottom of the bath were collected in a glass jar, and subjected to the following experiments.

(1) A portion of this air was passed into an inverted phial, previously filled with lime-water. The liquor immediately lost its transparency, and after agitation it was evident the quantity of the air was diminished; but a considerable portion remained which could not be made to unite with the lime in the lime-water.

Obs.—This experiment shows that fixed air constitutes one part of the elastic fluid now under examination.

(a) A lighted wax taper plunged into a jar of the air (A), was instantly extinguished.

(b) The same effect was produced when the air had stood all night in a glass jar inverted in water, and also when the fixed air had been previously separated by agitation in lime-water.

(c) A quantity of this air, mixed with nitrous air in a glass jar inverted in water, was suffered to stand all night. In the morning a diminution in the bulk of the air was indicated by the water having risen in the jar, and a quantity of sulphur had been formed.

Obs.—From the experiments (a, b, c) it appears that hepatic air constitutes another part of the elastic fluid, spontaneously rising in bubbles from the springs in the bath. It now remains to determine whether these airs exist in combination with the water, and if so, in what quantity and in what proportions.

(2) Lime-water being mixed with the water warm from the bath, a considerable milkiness ensued, and a copious white sediment was soon deposited.

Obs.—This sediment may be the lime rendered mild or insoluble by its union with fixed air, or it may be magnesia, or argillaceous earth.

(a) To determine this, lime-water was added to some water from the bath that had stood exposed to the atmosphere for eighteen hours. The milkiness and the sediment were less obvious than before.

Obs.—This shows that the milkiness and the sediment, in the preceding experiments, had been in part caused by the union of lime with aërial acid; for some of that having been allowed to escape, the deposition was less sudden and less copious.

(b) When lime-water had been mixed with bath water that had been boiled, only a very small sediment took place, and that very slowly subsiding.

Obs.—The aërial acid having been wholly dissipated by the boiling of the water, this sediment can be no other than magnesia, or argil, or some metallic calx.

(3) Some quicksilver was put into a phial, which was then filled with water warm from the spring, and closely corked. After some hours, the surface of the quicksilver had assumed a purplish black colour.

(a) Quicksilver, after standing twenty-four hours with water that had been previously boiled, suffered no change in its appearance.

Obs.—It is evident that the change of colour on the surface of the quicksilver was caused by hepatic air in the water, and that this as well as the fixed air had been entirely driven off by boiling.

(4) About two pounds of the Caldas water were put into a thin glass vessel, along with two ounces of distilled water. The vessel was put over a charcoal fire, but no particular change took place until the water had boiled for a short

time. It then became rather milky, and when removed from the fire deposited a sediment.

Obs.—This sediment must be either of an earthy or a metallic nature, or both, and it had been united to the water by means of the fixed or hepatic airs, which had now been dissipated by the boiling heat. Should a water be fully saturated with selenitic salt, a small degree of boiling will cause some of it to subside: it was to prevent a deception from such a cause that the distilled water was added.

(5) In order to determine the quantity and proportions of the fixed and hepatic airs, which have been shown to exist in this water, a large Florence flask was filled with the water at the spring. The mouth of the flask was instantly stopped with a cork previously adapted to it. One end of a glass tube perforated the cork, and the other end was bent, so as to allow of its being readily introduced under a glass jar filled with quicksilver, and inverted into a basin of quicksilver.

The apparatus being thus disposed, a spirit lamp was brought under the flask, and the water in it made to boil, so long as any air continued to rise up into the jar through the column of quicksilver. It was observed that the airs were not at all separated, until the water had fully boiled.

The quantity of elastic fluids thus collected was equal to one-twentieth part the bulk of the water.

(a) Lime-water being passed up through the quicksilver in contact with the air, and gently agitated, absorbed one twenty-fifth part of it, and instantly became turbid.

Obs.—It appears then, from these experiments, that twenty pounds of this water contain a bulk of elastic fluids equal to the bulk of one pound of water; that only one twenty-fifth part of this is fixed air, and the other twenty-four parts hepatic air.

I must acknowledge that I have some doubts about the accuracy of experiment (5), so far as it may affect the quantities of the airs; for I suspect some parts of them must have escaped, owing to the imperfections of the apparatus. I would have repeated that experiment, so as to have ascertained this point, but that unfortunately the necessary quantity of quicksilver could not be procured, till the time for my remaining at the Caldas was nearly expired. I hope these doubts may induce some philosophic chymist to repeat this experiment more at leisure, and with an apparatus better suited to insure an accurate result.

RE-AGENTS.

(B 1) The Caldas water, whether warm or cold, decomposes soap.

(2) Poured into boiling milk, does not curdle it.

(3) Litmus.—If litmus be added to the water just taken from the spring, it produces the

slightest imaginable red tinge, but so slight, that without a standard of litmus mixed with distilled water, to compare with, it would hardly be perceived.

This tinge continues when the water becomes cold; and it likewise takes place though the water should stand some hours in an open vessel, before the litmus be added to it; but not at all if the water has been boiled.

Obs.—This change in the litmus indicates the presence of hepatic air, and, at the same time, demonstrates that none of the mineral acids exist in the water in an uncombined state, for in that case the colour would be a full red. Fixed air, already shown to exist in the Caldas water, very readily, and in very small quantity, changes the blue of litmus to a red; but the hepatic air, though it effects a less degree of change, seems to seize upon it and protect it against the action of the fixd air.

Had vitriolic or muriated alum been present, the litmus would have shown it, by assuming a purplish hue.

(4) BRAZIL WOOD.—An infusion of it in water and also paper dipped in the infusion, were slowly changed by the Caldas water, so as to assume a very slight bluish cast.

Obs.—This effect is generally produced by the presence of magnesia aërata, or by alkalies; but the latter cannot exist in this water, which abounds with selenite.

(4) Paper tinged with Brazil wood, and dipped

into Caldas water which had been boiled, assumed the same slight bluish cast that it had done with the water just taken from the spring.

Obs.—This proves that the whole of the aërated magnesia had not been separated by the boiling heat, nor will it entirely separate until the last stage of the evaporation. It shows also, that the change produced in the colour of this re-agent was not owing to the fixed or to the hepatic air.

(5) GALLS.—Tincture of galls at first produced no change; but after standing some hours a very slight opal colour prevailed.

(6) PRUSSIAN ALKALI.—After standing several hours the water had rather an opal cast.

Obs.—This and the preceding experiment indicate the presence of a small quantity of iron, combined with hepatic air, which has the power to prevent the usual action of the re-agents employed. It also demonstrates the absence of other metallic substances, and that no barytes is present either in an aërated or otherwise combined state.

(7) ACID OF SUGAR.—Some spiculæ of it, put into a glass of the Caldas water, were presently surrounded by a white precipitation, thus indicating the presence of calcareous earth, either *per se* or in combination.

(8) VITRIOLIC ACID.—This acid caused no other change than the separation of a few air bubbles.

Obs.—Thus farther demonstrating the absence of the barytic earth; for the smallest portion of that earth, uniting to the vitriolic acid, forms a compound which is absolutely insoluble in water.

(9) VEGETABLE ALKALI CAUSTIC.—(a) With the water hot from the spring, a dirty brown precipitate.

(b) With water that had stood to grow cold, less brown.

(c) With water that had been previously boiled, nearly a white precipitate, and less in quantity.

(10) VEGETABLE ALKALI AERATED.—(a) With the hot water, dirty brown precipitate.

(b) With the water when cold, nearly the same.

(c) With the boiled water, nearly a white precipitate.

The effects of the *fossil* and *volatile* alkalies were nearly the same as those enumerated above.

Obs.—This series of experiments with the alkalies in different states demonstrates the presence of one or more of the absorbent earths, the naturally white colour of which was injured by the presence of hepatic air; and when that air had been dissipated by boiling, the precipitated earths became nearly white, but not perfectly so upon account of the iron, whose presence has been shown before by the galls and the Prussian alkali.

(11) DISTILLED VINEGAR.—The different precipitates, mentioned to have been thrown down by the alkalies, were put into cold distilled

vinegar, which dissolved nearly the whole of them.

Obs.—Had these precipitates consisted only of magnesia and calcareous earth, the vinegar would have dissolved them entirely; but the portion left undissolved shows the presence of argillaceous earth, though in very minute quantity.

(12) MURIATED BARYTES.—A solution of this added to the hot, the cold, and the boiled water, yielded a white precipitation; but after standing some time the former turned to a greyish brown colour.

Obs.—These circumstances show the presence of the vitriolic acid in a state of combination; for that acid quits every other basis to unite with the barytic earth, forming therewith an insoluble compound. The non-existence of an uncombined acid had been proved before.

(13) NITRE OF SILVER.—A pearl colour precipitate, changing to a purplish dark lead colour; the water after being boiled gave a similar precipitation, but it did not change to so dark a colour.

Obs.—Several causes exist in the water to separate the silver from the nitrous acid; but the principal agent is common salt. The dark colour which the calx assumes is owing to the hepatic air.

(14) SACCHARUM SATURNI.—In the hot water, a copious dark chocolate-coloured precipitate. In the boiled, less copious and very light grey.

Obs.—The calciform precipitate is here in large quantity, because the lead is thrown down by the acids of vitriol and common salt, as well as by the earths.

(15) Vitriol of Iron.—In the hot water, a copious dark greenish brown precipitate. In the boiled water, less copious and of a reddish brown.

Obs.—The quantity of the precipitate is smaller from the boiled water, in consequence of the separation of the aërated calcareous earth, and of part of the aërated magnesia. The same observation applies to the preceding experiment.

(16) Corosive Sublimate.—In the hot water, a slight precipitation slowly taking place; in the boiled water, still more slowly; the colour in both that of an opal.

Obs.—The common salt, in this instance, having no effect on the re-agent, the quantity of the metallic calx precipitated is comparatively much smaller. That the colour of the metallic calxes in experiments 13, 14, and 15, was caused by hepatic air, is still further proved by the greater whiteness of the precipitate in this experiment, for that air has but little effect in darkening the calx of mercury when in the state that it is in after separation from the marine acid in this preparation.

(17) Muria Calcarea.—A white precipitate, slowly subsiding and small in quantity.

Obs.—This precipitate does not dissolve but in a large quantity of water, which shows that the re-agent has been decomposed by a vitriolic salt, and that selenite has been formed. Now from the preceding experiments, joined to a consideration of the established laws of chymical attractions, it is evident that the only vitriolic salt capable of producing this change and at all likely to exist in this water, is the Glauber's salt.

(18) White Arsenic.—Small fragments, or a solution of this substance, put into the water warm from the bath, occasioned a yellow but very small precipitation.

Obs.—The sulphur of the hepatic air, uniting to the calx of the arsenic, converts it into orpiment.

(19) Iron.—Scoriæ, or filings of iron, digested for twenty-four hours in a bottle filled at the bath, and closely stopped, gave to the water a very evident chalybeate taste; and it assumed a purple tinge on the addition of tincture of galls.

(a) Scoriæ of iron, digested in the same manner in water that had stood thirty-six hours in an open vessel, and also in water that had been boiled, showed no such indications of a chalybeate impregnation.

Obs.—Iron may be dissolved either by fixed or by hepatic air; but in the present instance the former seems to have been the menstruum, because, when it had been allowed to escape, none of the iron could be detected by the usual reagents. In the water that had stood exposed to the open air for thirty-six hours, the greater part of the hepatic air remained; but, whatever portion of the iron it might have dissolved, it was not sensible to the action of the Prussian alkali, which clearly shows that in the first experiment it had been dissolved by the aërial acid.

EVAPORATION.

Previous to the commencement of this set of experiments, a large quantity of the water had been evaporated, and the contents subjected to a variety of trials, the more accurately to determine their nature, and to open a road for the execution of the following plan. A particular narrative of these preliminary experiments would be tedious and useless; but it is necessary to remark, that paper dipped in the saline matters when in their most concentrated states of solution, and set on fire, did not show the least vestige of the presence of any nitrous salt.

(C) Eight medical pounds, sixteen ounces each, Troy weight, of the Caldas water, taken immediately from the spring, were evaporated by a heat short of boiling, in a well-tinned brass vessel, until only about two pounds remained. During the first part of the process, some powdery substances subsided, and some time afterwards selenitic salt began to crystallize and fall down.

The contents, both liquid and solid, were now carefully removed into a shallow basin made of a very compact unglazed porcelain, and by the gentle heat of a lamp the evaporation was continued to dryness, taking care to diminish the heat when the liquor was nearly wasted.

The solid matter, being very carefully collected, was uniformly dried in the heat of boiling water, and was then found to weigh three hundred and forty grains.

It is to be understood, that all the substances hereafter mentioned to be dry, were dried in the same way, and with the same degree of heat, for otherwise it is not possible to reduce saline substances to any exact standard of weight, on account of the different quantities of water contained in, or attached to their crystals.

Let it be also noticed, that in the different separations hereafter to be described, the use of filtering paper should never be allowed, it having been found by experience that wherever filters are used, there will be a loss of some parts of the substances. The powdery matters should be allowed time to subside, and the supernatant liquor be poured off, and in some cases a glass syphon may be used. The subsiding of the powders is greatly promoted by placing the vessels over the axis of a horizontal wheel, and by slowly turning the wheel, imparting to them a centrifugal and circular motion.

(1) One pound of distilled water was put to the three hundred and fifty grains of saline and earthy matters, and boiled for a few minutes. After standing to settle, this water was decanted, as much more was added, and the process repeated four times. A few ounces more distilled water boiled upon the residuum, did not appear

to have dissolved any part of it; it was, therefore dried and was found to weigh twenty grains.

Obs.—As a quantity of selenitic crystals had been observed to form during the evaporation of the water, and as it requires near one ounce of water to dissolve one grain of this salt, it was necessary to employ the quantity of distilled water above mentioned in order to insure the solution of the saline matter.

(2) The twenty grains, which had refused to dissolve in boiling water, were digested in the cold, for four hours in distilled vinegar, which dissolved fifteen grains and a half, leaving a residuum of four grains and a half.

Obs.—The vinegar, unassisted by heat, dissolves readily the magnesia and the calcareous earth, but the calciform iron, the argil, and the silex, if present, are left untouched by that acid.

(a) Concentrated vitriolic acid was slowly dropped into the acetous solution, so long as any precipitation took place. This precipitate was selenitic salt, formed by the vitriolic acid combining with the calcareous earth which the vinegar had dissolved. It weighed twenty grains and a half. Now as twenty grains and a half of selenite contain six grains and a half of pure calcareous earth, and as six grains and a half of the pure earth weigh, when united to the aërial acid twelve grains; it is evident, that twelve grains of this earth, in an aërated state, had been suspended in the eight pounds of Caldas water.

(b) A solution of mild fixed vegetable alkali was gradually dropped into the acetous solution, to the point of saturation. The liquor was then boiled for a few minutes, and the precipitate suffered to subside. On examination, it proved to be magnesia, and weighed three grains and a half.

Obs.—It was necessary in this case to boil the liquor, in order to discharge the superfluous quantity of aërial acid, otherwise the whole of the magnesia would not have been separated.

(3) The four grains and a half left undissolved by the vinegar (C 2), were boiled for a short time in diluted marine acid, which left undissolved only three-fourths of a grain.

(a) To this solution in marine acid, the Prussian alkali was added, which precipitated a quantity of iron in the form of Prussian blue.

(b) When the whole of the iron was thus separated, and the supernatant liquor poured from the Prussian blue, mild fixed vegetable alkali was added to saturate the marine acid, and an earthy precipitate subsided, which, when collected and dried, weighed one grain and a quarter, so that the iron precipitated by the Prussian alkali had been equal to four grains and a half. This last mentioned earthy precipitate proved to be argil.

(c) The three-fourths of a grain left undissolved by the marine acid (C 3) appeared, upon examination, to have the well-known properties of siliceous earth.

(4) The four pounds of distilled water, employed in experiment (C 1), having dissolved three hundred and twenty grains of saline matter, the water was evaporated by a gentle heat until the salts were obtained in a dry state. The dry saline mass was reduced to powder and boiled for a short time in four ounces of alcohol, which dissolved sixty-four grains, for the remaining saline matter after being dried was found to weigh only two hundred and fifty-six grains.

(a) The salt which the alcohol had dissolved was found to consist of magnesia saturated with marine acid.

Obs.—This was ascertained by precipitating the magnesia from one part of it by the addition of lime-water, and by separating the marine acid from the other part by the affusion of concentrated vitriolic acid.

(5) Two ounces of distilled water being added to the two hundred and fifty-six grains of saline matter left undissolved by the alcohol, forty-two grains only remained, so that these two ounces of water had dissolved two hundred and fourteen grains.

Obs.—The insoluble residuum of forty-two grains was found to consist entirely of selenitic salt, but as the quantity of water now used would dissolve two grains of that salt, we must reckon that the eight pounds of Caldas water subjected to these experiments actually contained forty-four grains of selenite.

(6) The solution in the two ounces of dis-

tilled water (C 5) being very slowly evaporated, cubic crystals of common salt were formed. These were from time to time taken out of the liquor with the point of a small silver spoon, and at length the remaining liquor, now reduced to a small quantity, was suffered to stand for a night in a cool place. In the morning, it was found to contain crystals of Glauber's salt to the amount of twelve grains in weight.

(a) It being found impracticable to obtain a perfect separation of the common and the Glauber's salt, by means of crystallization, the following method was adopted: the whole of the salt (C 5) was re-dissolved in distilled water, except the twelve grains of Glauber's salt separated before, and terra ponderosa salita was gradually added, until no further precipitation took place.

The vitriolated barytes thus formed, weighed forty-two grains. Now as one hundred grains of Glauber's salt give, on the addition of a proper quantity of the terra ponderosa salita, eighty grains of vitriolated barytes, it is evident that this solution contained fifty-two three-fourths grains of Glauber's salt, and allowing the one-fourth of a grain to have been produced from the selenite before mentioned to have been contained in this solution, *(C 5, Obs.)* the whole quantity of Glauber's salt contained in eight pounds of the Caldas water will be sixty-four, and the common salt one hundred and forty-eight grains.

From a retrospective view of all the experiments, it appears that one hundred and twenty eight ounces of the Caldas water, examined in the month of April, 1793, contained—

Fixed air	¼	ounce	measure.
Hepatic air	6¼	ounce	
Calx aërata	12	grains.	
Magnesia aërata	3½		
Ferrum hepatisatum	2½		
Argillaceous earth	1¼		
Siliceous earth	¾		
Magnesia salita	64		
Selenitic salt	44		
Glauber's salt	64		
Common salt	148		

If it should appear, from future observations, that the quantity of water discharged by these springs should vary at different seasons of the year, it is probable that the quantities and proportions of the ingredients may vary likewise; but as the application of the water is pretty much restricted to the summer months, these differences will hardly be such as to affect the use of it in a medical view.

It would be foreign to the purpose of this essay to treat of the diseases and constitutions in which such a water promises to be useful.* Those points have already been in some measure ascertained, and there can be no doubt but the experience and sagacity of the physicians of Portugal will lead to the proper discrimination as well of cases as of seasons and constitutions.

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* Vide a note on this subject in the Memoir. Vol. i. page 145.

However, it may not be improper to observe, that as cases may offer, particularly those of Atonic Gout, in which a more powerful chalybeate would be more agreeable to the stomach, as well as more useful to the constitution in general, it is easy to increase the chalybeate impregnation, as may be seen by referring to the experiment marked (B 19).

If some clean filings or scoriæ of iron be put into a glass bottle filled with the water at the principal spring in the men's bath, instantly corked, and then immersed in the sand at the bottom of the bath, it will be found by the following morning to have attained a very sensible and very agreeable chalybeate flavour, and this without any possibility of injury to the other component parts of the water.

Should this hint be ever reduced to practice, it will be convenient to fence off one corner of the bath, within which the bottles may be safely deposited.

It may be further observed, that the waters of the Caldas cannot be used with advantage at any distance from the springs, the hepatic air is so ready to decompose, forming, according to circumstances, either sulphur or vitriolic acid. The water in consequence loses at least one of its most useful ingredients, and new compounds will be formed, which had no existence in it when fresh taken up.

Experiments upon the different kinds of MARLE *found in Staffordshire.*

(Read before the Royal Society, February 4, 1773.)

No.	DESCRIPTION.	Quantity of calcareous earth in half a dram, as separated by the nitrous acid, and precipitated by mild fixed alkali.	What was left after the foregoing separation was no longer acted upon by the nitrous acid, but being		One dram of each of the marles being calcined, weighed			The calcined marles put into water, produced
		Grains.	Mixed with water became	When burnt,	Grains	Lost Grains.	Burnt to	
1	Red and blue intermixed in small friable lumps	1	Uniform and plastic	A hard brick	52	8	Red brick	No effect.
2	Red, in small friable lumps	0¾	Uniform and plastic	A hard red brick	53	7	Red brick	No effect.
3	Gray, in large hard lumps	5	Plastic, but a little gritty	A soft yellowish brick	49	11	Soft yellow brick	Weak lime water.
4	Red, hard, compact	3	Uniform and plastic	A hard red brick	50	10	Red brick	No effect.
5	Red, with gray spots, in large hard lumps, scarcely to be broken with a hammer	8½	Plastic	A soft pale red brick	48	12	Hard gray stone	Lime water.
6	Light gray, like a grit stone	8	Gritty, no union	No union	51	9	Soft and stony	Lime water.
7	Brown, friable, in large lumps	18	No union	A little cohesion	46	14	Soft stone	Lime water.
8	Red, in large friable lumps	14	Plastic, but a little gritty	A soft red brick	48	12	Soft stone	Strong lime water.
9	Brownish white, very hard, like calcareous incrustations	16	No union, gritty	No union	43	17	Soft stone	Strong lime water.
10	Lead colour, friable, flaky	14½	No union, gritty	No union	48	12	Soft stone	Strong lime water.
11	Brown gray, very hard, in irregular lumps	16	No union, gritty	No union	40	20	Soft stone	Strong lime water.
12	Lead colour, in powder and in small hard lumps	20½	Uniform and plastic	A soft whitish brick	29	31	Powdery	Strong lime water.

Half a dram of the marles being put into similar glass cups, two drams of nitrous acid being added to each glass, they all effervesced, No. 1 and 2 the least, No. 12 the most. The effervescence having ceased, and six drams of rain water being added to each glass, the liquors were all filtered, and after filtration changed violet paper to a red colour. To the filtered colours was gradually added mild fixed alkali, sufficient to saturate the acid, and precipitate all the earth it had dissolved. The precipitated earth being washed in rain water till free from all saline matter, weighed, when dry, as in column the third. Column the fourth shows that, after the separation of the calcareous earth, there remained in No. 1, 2, 4, a red clay; in No. 12 a white clay; in No. 8 a red clay, and a portion of sand; in No. 3 a whitish clay, with a portion of sand; No. 6, 9, 10, 11, pure sand; and in No. 7 sand, with a small portion of clay. These residuums were all washed with rain water before they were burnt. The precipitated powders being mixed together, eighty-two grains thereof put into a crucible, and calcined with a strong heat, lost thirty-five grains in weight. Rain water was poured upon the calx; the next morning there was a pellicle upon the surface of the water; it tasted strongly of lime, and let fall a calcareous earth upon the addition of mild fixed alkali. The marles were kept for some weeks in a dry place before they were made use of. They were all got out of marle pits in the neighbourhood of

Stafford, except No. 12, which is found near the Duke of Bridgewater's canal, in a powdery form, and when mixed with one-fourth part of clay, is burnt to quick lime. All the above marles crack and fall to pieces when exposed to the weather.

The foregoing experiments were undertaken with a view to ascertain how far it would be advisable to attempt burning the marles of this country into quick-lime, for the purposes of agriculture; they may likewise furnish us with some useful hints relative to the kind of marles proper to be used upon different kinds of lands. Perhaps the calcareous earth, united with clay, as in No. 1, 2, 4, &c. may be the best for light sandy soil, and No. 6, 9, 10, 11, where the calcareous earth is united with sand, the most eligible where the land is already stiff and abounding with clay. How far the different quantities of fixable air, or other volatile parts, contained in each of the marles, as shown by column the fifth, will influence their preference in agriculture, must be left to the experience of the farmer to determine.

An Analysis of two Mineral Substances:—viz. the ROWLEY RAG-STONE *and the* TOAD-STONE.

(Read before the Royal Society, May 16, 1782.)

To Sir JOSEPH BANKS, *Bart. P.R.S.*

Birmingham, October 1, 1781.

DEAR SIR,

I have the pleasure to lay before you an analysis of two mineral substances, by Dr. Withering, of Birmingham, whose accuracy in processes of this kind will, I doubt not, give you and the members of the Royal Society great satisfaction.

It may, perhaps, throw some additional light on the subject of these fossils, to inform you, that the Rowley rag appears, by its texture before and after fusion, and also by the quantity and quality of the air which it yields in fusion, to be the same thing with the basaltes with which you have favoured me from Scotland, and that the Toad-stone, treated in the same manner, appears (after the calcareous part has been dissolved out of it) to resemble some of the species of lava, except that it yields much more air. As Dr. Withering has sent specimens of the fossils in their natural state, I thought it might not be amiss to present along with them the *glassy substances* into which they are reduced by fusion.

I am, with the greatest respect, &c.

J. PRIESTLEY.

To the Rev. Dr. PRIESTLEY.

Birmingham, March 28, 1782.

SIR,

I now send you the results of my examination of the Toad-stone and the Rowley Rag-stone, being part of a plan which I have long since formed for a chymical analysis of all the substances that are known to exist in the earth in large quantity.

Some years ago, I transmitted to the Royal Society an analysis of the different Marles found in Staffordshire, which they did me the honour to insert in their Transactions; if they think these papers likewise worth their adoption, I shall send them the results of my future inquiries.

In the course of experiments which this subject has led me to, I found it convenient to form some new tables, and to enlarge some that were less completely formed before. These tables will be useful in other branches of chymical inquiry. One of them I subjoin to the present papers. The facts taken from M.

Macquer are marked with an M, those with the * are the consequence of my own experiments.

In order to save much repetition, in future, it may not be amiss to mention, once for all, a few particulars in the conduct of these processes.

1st. By *water* is always meant water distilled in glass vessels, or by means of a large tin refrigeratory in Mr. Irwin's method.

2dly. Only glass or china vessels are used in the liquid processes.

3dly. By a mortar, I mean those excellent ones made by Mr. Wedgewood; or, as will be specified at the time, a steel mortar tempered so hard that it will bear the grinding of enamel in it without discolouration.

4thly. Filtres are never employed, it being found impossible to get the quantities accurate where they are used. The powdery parts are allowed to subside until the supernatant liquor becomes clear. This sometimes requires days or weeks, but I am ignorant of a better method. By giving the vessels a circular motion round their axes, I can greatly facilitate the subsiding of the solid contents. If the separating vessels are made like a common tart-dish, with a spreading border, the liquors may be poured off very near, without disturbing the sediments.

5thly. Phlogisticated alkali means the vegetable fixed alkali prepared by the deflagration of nitre and crystals of tartar dissolved in water, and boiled with Prussian blue in such quantity that it will not any longer precipitate an earth from an acid.

I remain, &c.
W. WITHERING.

ROWLEY-RAG.

THE stone which is the subject of the following experiments forms a range of hills in the southern part of Staffordshire. The lime-stone rocks at Dudley bed up against it, and the coal comes up to the surface against the lime-stone. The highest part of the hills is near the village of Rowley. The summit has a craggy broken appearance, and the fields on each side, to a considerable distance, are scattered over with large fragments of the rock, many of which are sunk in the ground. In a quarry, near Dudley, where a pretty large opening has been made in order to get materials for mending the roads, the rock appears to be composed of masses of irregular rhomboidal figures: some of these masses enclose rounded pebbles of the same materials. At the distance of four, five, or six miles from the hills, as at Bilston, Willenhall, and Wednesbury, the rag-stone is frequently found some feet below the surface, in rhomboidal pieces, forming a horizontal bed of no great depth, and seldom of more than a few yards extent. Over the whole of this tract of country it is used to mend the roads, and lately has been carried to Birmingham to pave the streets. Some people sell it in powder, as a substitute for emery in cutting and polishing.

More obvious Properties.

Its appearance dark gray, with numerous minute shining crystals. When exposed to the weather gets an ochrey colour on the outside; strikes fire with steel; cuts glass; melts, though not easily, under the blow-pipe. Heated in an open fire becomes magnetic, and loses about three parts in one hundred of its weight.

EXPERIMENTS.

(A) After three drams had been broken to small pieces with a hard steel hammer upon a plate of the same metal, it was ground to an impalpable powder in one of Mr. Wedgewood's china mortars. The mortar, which had been previously weighed, lost only one-third of a grain weight during this operation.

(B) This powder was repeatedly washed with pure water so as to carry off all the finer parts, and the coarser ground again, until the whole was washed away. The washings were then filtered, and the powder carefully collected and dried. The water employed in the washings did not appear to have dissolved any part of the stone, for no precipitate was formed either upon the addition of mild fixed alkali or of silver dissolved in the nitrous acid.

(C) One hundred parts of this powder were put into a small matrass, and covered with marine acid, a degree of heat was excited, and a very slight effervescence took place. Water was then added, and the mixture kept boiling for half an hour. The liquor was decanted off, and more acid added, which was boiled as before. This was decanted and the residuum washed with water until the water came off tasteless. These waters were added to the liquors before decanted. The powder had now an ash-coloured appearance, and when dried weighed 80¼. To the liquors (C) phlogisticated fixed alkali was added until no more Prussian blue was precipitated. To effect this, it took one ounce five drams and twelve grains of the phlogisticated alkali. The precipitate, when washed and dried, weighed 47.

(E) The powder of 80¼ (C) mixed with twice its weight of fossil fixed alkali, was put into a black-lead crucible, and exposed to a red heat for two hours. The heat was never sufficient to render the mass fluid, nor to make it adhere firmly to the crucible. The saline part was then washed away by repeated affusions of hot water. To the remaining powder marine acid was added repeatedly, and boiled as before. The powder was now perfectly edulcorated by hot water, and when dry weighed 47½.

The above liquors were all added to the liquor (C) and phlogisticated fixed alkali was dropped in until no more Prussian blue was precipitated; to effect this, half an ounce of the alkali was required. This precipitate weighed 19, so that the whole of the Prussian blue weighed 66. After calcination in a crucible it was reduced to 31½, and was then wholly attracted by a magnet.

(F) Mild fixed alkali was now gradually added to the liquors after the separation of the Prussian blue, and a white powder was precipitated. This powder when well washed and dried, weighed 46¾. After being exposed to a low red heat for ten minutes, it weighed only 32½.

(G) The edulcorated powder (E) was now perfectly white, was not acted upon either by the vitriolic, nitrous, or marine acids, but readily melted into a glass with fossil fixed alkali; during the melting an effervescence took place.

(H) The white powder (F) readily dissolved in diluted vitriolic acid, and under a slow evaporation formed crystals which had the appearance and the taste of alum.

These crystals were then reduced to powder, and boiled in alcohol. The alcohol was decanted off, but did not appear to have dissolved any part of the powder, nor did it afford any precipitate upon the addition of mild fixed alkali.

CONCLUSIONS.

From these experiments it appears, that the Rowley rag-stone consists of siliceous earth, clay, or earth of alum, and calx of iron. From the latter must be deducted 11½ for the quantity of calciform iron found by experiment to be contained in the quantity of phlogisticated alkali made use of, and then the proportions in 100 parts of the stone will be these:—

Pure siliceous earth	47½
Pure clay, free from fixable air ..	32½
Iron in a calciform state	20
	100

From this view of the component parts of this stone, it is not improbable, that it might advantageously be used as a flux for calcareous iron ores. The makers of iron are acquainted with such ores, but never could work them to advantage for want of a cheap and efficacious flux.

TOAD - STONE.

From Derbyshire, sent to me by Mr. Whitehurst, who has so fully and so accurately described the mode of its stratification, that it is needless to enlarge upon that subject.

More obvious Properties.

Of a dark brownish gray, a granulated texture, with several cavities filled with crystallized spar. It does not strike fire with steel. It melts to a black glass.

EXPERIMENTS.

(A) One hundred parts rubbed to an extremely fine powder in a china mortar, and boiled in marine acid, the solution was decanted;

the undissolved part, after proper washing and drying, weighed 71.

(B) The undissolved part was rubbed with twice its weight of mild fossil alkali, and then exposed to a red heat in a black-lead crucible for one hour.

(C) This mixed mass was reduced to powder, and repeatedly boiled, first in marine, afterwards in strong vitriolic acid, the residuum now weighed 56, and was perfectly white.

(D) The liquors of Exp. A and C being put altogether, phlogisticated fixed alkali was added until no further precipitation ensued. This precipitate was a Prussian blue, which when washed and dried, weighed $56\frac{5}{10}$.

After exposure to a red heat in a crucible for forty-minutes, it weighed only 29, and was wholly attracted by the magnet. Now the 2 oz. 5 dr. and 32 gr. of phlogisticated fixed alkali used in this experiment contained 13 gr. of calciform iron, as ascertained by a separate trial; therefore deducting 13 from 29, we have 16 for the quantity of calciform iron obtained from the stone.

(E) The earthy parts were next precipitated from the liquors by the addition of mild fossil alkali. The precipitate, when perfectly edulcorated and dried, weighed $29\frac{8}{10}$.

(F) Distilled vinegar was added to this powder, and suffered to stand in a cool place for four hours; the vinegar was poured off, and the residuum repeatedly washed with pure water.

To these liquors mild fixed alkali was added, and a white precipitate subsided, which when washed and dried weighed $7\frac{5}{10}$.

(G) To the residuum (F) dilute vitriolic acid was added, a solution took place, which solution, by evaporation and crystallization, yielded alum.

(H) The part of the residuum (F) undissolved by the vitriolic acid was boiled in nitrous acid, in marine acid, and in aqua-regia, without being diminished; the weight of it when dried was $7\frac{5}{10}$. It could not be fused by the greater heat of a blow-pipe, but melted into a glass when mixed with calcareous earth.

(I) The undissolved part (Exp. C) was not fusible by itself, nor was it acted on by vitriolic, nitrous, or marine acid. It melted into a glass with fossil alkali.

(K) The precipitate of $7\frac{5}{10}$ (Exp. F) after a sufficient exposure to heat, was put into an ounce of water; the next morning the water had a pellicle upon its surface, and tasted like lime-water.

CONCLUSIONS.

Hence it appears that 100 parts of this specimen of toad-stone contained—

(C)	Siliceous earth	56	$63\frac{5}{10}$
(H)	More ditto................	$7\frac{5}{10}$	
(D)	Calciform iron		16
(F, K)	Calcareous earth		$7\frac{5}{10}$
(G, H)	Earth of alum		$14\frac{8}{10}$
			$101\frac{8}{10}$

From the addition of $1\frac{8}{10}$ of weight, it is probable that the substances capable of uniting with fixable air, were not in the specimen used fully saturated with it, as they would be after their precipitation by the mild alkali.

Upon repeating these experiments with different portions of the toad-stone, the quantities of the calcareous earth were found to differ a little; but nothing further appeared to invalidate the general conclusions.

A Table showing the Solubility or Insolubility of certain Saline Substances in Alcohol.

		Substances.	Results.
Vitriolic acid.	Neutral	Vitriolated tartar	Insoluble. M.
		Glauber's salt	Insoluble. M.
		Vitriolic ammoniac	Insoluble. M.
	Metallic	Vitriol of silver	Insoluble. M.
		——— mercury	Insoluble. M.
		——— copper	Insoluble. M.
		——— iron	Insoluble. M.
		——— zinc	Insoluble.*
	Earthy	Heavy spar	Insoluble.*
		Selenite	Insoluble. M.
		Alum	Insoluble.*
		Epsom salt	Soluble.*
Nitrous acid.	Neutral	Nitre	Soluble. M.
		Cubic nitre	Soluble. M.
		Nitrous ammoniac	Soluble. M.
	Metallic	Nitre of silver	Soluble. M.
		——— mercury	Insoluble. M.
		——— copper	Soluble. M.
		——— lead	Soluble.*
	Earthy	Calcareous nitre	Soluble. M.
Muriatic acid.	Neutral	Digestive salt	Soluble. M.
		Common salt	Insoluble. M.
		Sal ammoniac	Soluble. M.
	Metallic	Luna cornea	Insoluble. M.
		Corrosive sublimate	Soluble. M.
		Muria cupri	Soluble. M.
		——— ferri	Soluble. M.
	Earthy	Muria calcarea	Soluble. M.
		——— magnesia	Soluble.*
		——— aluminosa	Soluble.*
Vegetable acid.	Neutral	Soluble tartar	Soluble.*
		Rochelle salt	Insoluble.*
		Vegetable ammoniac	
	Metallic	Verdigrease	Soluble.*
		Sugar of lead	Soluble.*
Calcareous acid.	Neutral	Vegetable alkali mild	Insoluble.*
		Foss. alkali mild	Insoluble.*
		Vol. alkali mild	Soluble.*
		Calcareous spar	Soluble.*

Experiments and Observations on the TERRA PONDEROSA, &c.

(Read before the Royal Society, April 22, 1784.)

SECT. I.

Terra ponderosa aërata.

This substance was got out of a lead-mine at Alston-Moor, in Cumberland.* I first saw it in the valuable collection of my worthy and ingenious friend Matthew Boulton, Esq. at Soho; who, when he picked it up, conjectured, from its weight, that it contained something metallic. About two years ago I saw it in his possession, and partly from its appearance being different from that of any calcareous spar I had seen, and partly from its great weight, I suspected it to be the *spatium ponderosum.*

A few experiments, made at the moment, confirmed my suspicions, at least so far as to show that it contained a large proportion of the *terra ponderosa* united to fixed air; but I did not then flatter myself that it would prove so pure as I afterwards found it to be.

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* Or, as since appears, more probably from the mine of Anglezarks, near Chorley, in Lancashire.—ED.

Professor Bergman, in his Sciagraphia Regni Mineralis, published last year at Leipsic, conjectures (§ 58), with his usual sagacity, "Terra ponderosa *nitrata* forte alicubi nativa occurrit, a nemine tamen adhuc inventa, quod etiam valet de *aërata.*"

I was much delighted by the detection of a substance which promises to be of very considerable utility in chymical inquiries, and more so when I found it to be a native of this country; for it is not improbable that it may be met with in many other mines, besides that at Alston-Moor.

Mr. Boulton, with his usual benevolence, presented me with a piece of it, part of which accompanies this paper, for the inspection of the members of the Royal Society.

More obvious Properties.

Its general appearance is not much unlike that of a lump of alum; but, upon closer inspection, it seems to be composed of slender spiculæ in close contact, but more or less diverging. It may be cut with a knife. Its specific gravity is from 4,300 to 4,338.

It effervesces with acids, and melts under the blow-pipe, though not very readily. Placed in a covered crucible, in a hot parlour-fire, it lost its transparency.

After exposure to a moderate heat, in a melting furnace, it adhered to the crucible and exhibited signs of fusion; but it was not diminished in weight, did not feel caustic when applied to the tongue, nor had it lost its property of effervescing with acids. Hence it is probable that its loss of transparency was rather occasioned by numerous small cracks, than by any escape of the water of crystallization, or of its aërial acid.

EXPERIMENTS.

(A) Five hundred grains, dissolved in muriatic acid, in such a manner that nothing but elastic fluid could escape, lost in solution one hundred and four grains, and there remained an insoluble residuum of nearly three grains.

(2) In another experiment, one hundred grains lost in solution twenty-one grains, and there remained 0,6 of a grain of insoluble matter.

(B) One hundred grains dissolving in dilute muriatic acid, gave out twenty-five ounce measures of air. This air was received in quicksilver, and when the spar was wholly dissolved, the solution was boiled, in order to drive out what air might be lodged in it.

(2) This air was heavier than the atmospheric air; it was readily absorbed by agitation in water, it precipitated lime from lime-water, and it extinguished flame. The water which had absorbed it changed the blue colour of litmus slowly* to a

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* Other acids turn the blue of litmus instantly to a red; whilst water, impregnated with fixed air, does not change the

red; so that this elastic fluid was undoubtedly fixed air.

(C) The solution (B), by the addition of mild fossil fixed alkali, afforded a precipitate; which, after proper washing and drying, weighed one hundred grains.

(2) This precipitate, upon being again dissolved in marine acid, yielded only twenty ounce measures of fixed air.

(D) To a saturated solution in marine acid mild fixed vegetable alkali was added; the earth was precipitated and a quantity of fixed air escaped.

(2) The same thing happened when mild fossil alkali was added.

(3) When caustic vegetable alkali was used the precipitation took place, but without any appearance of efferverscence.

(4) Fifty parts dissolved in marine acid lost, during the solution, nearly 10,5. This solution, upon the addition of caustic vegetable alkali, let fall a precipitate which, when washed and dried, weighed 45,5.

(5) Phlogisticated alkali precipitated the whole of the earth from part of the solution (D); for mild fixed alkali, afterwards added to the filtered liquor, occasioned no further precipitation.

(E) Part of the precipitates (D 1, 2) after ex-

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litmus immediately; but, after some seconds, the red colour begins to appear and then gradually grows more distinct.

posure to a strong heat in a crucible, was thrown into water: next morning the water was completely covered with an ice-like crust and had the acrid taste of lime-water in a very high degree.

(2) The smallest portion of vitriolic acid added to this water occasioned an immediate and copious precipitation; and when this acrid water was diluted with two hundred times its bulk of pure water, the precipitation, upon the addition of vitriolic acid, was yet sufficiently obvious.

(3) A single drop of this acrid water, added to solutions of tartar of vitriol, Glauber's salt, vitriolic ammoniac, alum, Epsom salt, selenite, occasioned an immediate precipitation in all of these.

(F) The precipitate thrown down by the caustic vegetable alkali (D 3) was put into water, in expectation that it would make lime-water; but, neither upon standing nor after boiling, did this water exhibit any precipitation when concentrated vitriolic acid was dropped in it, nor had it any acrimonious or other peculiar taste.

(G) Concentrated vitriolic acid was added to one portion of the precipitate (D 3), concentrated nitrous acid to a second portion, and marine acid to a third portion: no effervescence could be observed, nor was there any appearance of solution. After standing one hour water was added, and the acids, thus diluted, were suffered to remain upon the portions of the precipitate for another hour. They were then decanted and saturated with mild fossil fixed alkali, but without any appearance of precipitation.

(H) The part precipitated by the phlogisticated alkali, when mixed with nitre and borax, and fluxed by a blow-pipe upon charcoal, formed a black glass; upon flint-glass, a white; and, upon a tobacco-pipe, an opaque yellowish white one.

(2) Another portion melted with soap and borax, in a crucible, formed a black glass, but without any metallic appearance.

(I) The insoluble residuum (A) was boiled in water, the water decanted, and mild fixed alkali added, but without any subsequent precipitation.

(2) This insoluble powder was not attracted by the nitrous or marine acids; but being put into vitriolic acid, and boiled a considerable time, until the acid became highly concentrated, it dissolved entirely, and separated again upon the addition of water. It will appear in the sequel, that the same thing happens to *marmor metallicum*, when dissolved by boiling in the acid of vitriol.

CONCLUSIONS.

Hence it appears that 100 parts of this spar contain

Terra ponderosa pura	78,6
Marmor metallicum	,6
Fixed air	20,8
	100

OBSERVATIONS.

1st. The quantity of mild fixed alkali necessary to saturate an acid, previously united to the terra ponderosa, contains more fixed air than is necessary to saturate that quantity of terra ponderosa (D 1, 2).

2dly. The terra ponderosa, when precipitated from an acid, by means of a mild fixed alkali (D 1, 2), readily burns to lime, and this lime-water proves a very nice test of the presence of vitriolic acid (E 2, 3).

3dly. It is very remarkable, that the terra ponderosa spar, in its native state, will not burn to lime. In the lower degrees of heat, it suffers no change, as was before observed, besides the loss of its transparency. When urged with a stronger fire, it melts and unites to the crucible, but does not become caustic.

I buried it in charcoal dust, in a covered crucible, and then exposed it to a pretty strong heat, but it did not part with its air.

May we not conjecture, then, that as caustic lime cannot unite to fixed air without the intervention of moisture, and as this spar seems to contain no water in its composition, that it is the want of water which prevents the fixed air assuming its elastic aërial state? This supposition becomes still more probable, if we observe that when the solution of the spar in an acid is precipitated by a mild alkali (C 1, 2), some water enters into the composition of the precipitate, for it weighs the same as before it was dissolved, and yet contains only 20 ounce measures of fixed air, whilst the native spar contained 25 ounce measures; so that there is an addition of weight equal to that of 5 ounce measures of fixable air, or 3¾ grains to be accounted for, which can only arise from the water; and this precipitate, thus united to water, readily loses its aërial acid in the fire (E 1).

4thly. Professor Bergman supposes the terra ponderosa to be a metallic earth;* its entire separation from an acid by means of the phlogisticated alkali (D 5) certainly favours such a supposition; but, if it be so, it is evident, from experiments (H 1, 2) that other means than those commonly employed must be used to effect its reduction.

5thly. The precipitate made by the caustic vegetable alkali (D 4) taking some of the alkali down with it, and thus forming a substance neither soluble in water nor in acids, is a very curious phenomenon.

I afterwards varied the experiment by adding the terra ponderosa lime-water (E) to caustic vegetable and caustic fossil alkali. In both cases this insoluble compound was immediately formed; but not so when caustic volatile alkali was used. This composition of an alkali and an earth certainly deserves more attention than I am at present able to bestow upon it.

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* See Preface to his Sciagraphia Regni Mineralis.

6thly. As it appears from experiments (D 1, 2, 3, 4) that fixed alkalies, both mild and caustic, separated the terra ponderosa from marine acid, I was at a loss to know why Professor Bergman, in his admirable table of simple elective attractions, placed the terra ponderosa caustica immediately under the vitriolic, nitrous, and marine acids, and consequently above the caustic alkalies. I was interested in the reality of the facts because I had so seldom seen reason to doubt the observations of that very excellent chymist, and therefore made the following experiments.

To different portions of terra ponderosa salita and terra ponderosa nitrata I added, drop by drop, caustic vegetable, caustic fossil, and caustic volatile alkalies. In every case the *earth* was thrown down; and I have so often repeated those experiments, to satisfy myself and others, that I am persuaded the terra ponderosa caustica ought to be placed below the alkalies, except in the column appropriated to the vitriolic acid; and it may be separated even from that acid, by the vegetable fixed alkali, if the alkali be applied *via sicca,* as will appear in the next section.

7thly. The necessity for using pure acids upon many occasions, and the difficulty of obtaining them pure, are sufficiently obvious. The *vitriolic acid,* as made in the large way, is generally pure enough for most purposes. It is apt to get coloured by inflammable matter, but this is seldom an inconvenience; and, when it would be so, it is easy to drive it off by boiling the acid in a Florence flask over a common fire. But there is another cause of impurity in this acid which appears upon diluting it with water; for then it becomes milky, and, in a short time, a powder subsides.*

The acid may be freed from this powder either by distillation in glass vessels, which is a tedious and dangerous process, or by the affusion of water; and, after the powder has subsided, a gentle evaporation will drive off most of the superfluous water.

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* About two years ago I examined this powdery matter; both that which was thrown down by dilution with water, and also some which Dr. Priestley gave me, being the residuum of vitriolic acid distilled to dryness in a flint-glass retort.

1stly. Repeated boiling in water reduced six and a half grains to two grains.

2dly. This solution, by gentle evaporation, afforded five grains of crystals, as hard and as tasteless as selenite.

3dly. To these crystals, re-dissolved in water, mild fossil alkali was added, and a white powder precipitated.

4thly. This powder, after exposure to a pretty sharp heat, was thrown into water; part of it dissolved, and the water got the taste and other properties of lime-water.

5thly. The insoluble part (1) suffered no change by boiling in nitrous acid, one half of it mixed with borax, and exposed to the blow-pipe upon charcoal, vitrified; the other half mixed with borax and charcoal-dust likewise vitrified.

Conclusions.—It appears then, that the greater part of this substance was calx vitriolata, or selenite, the remainder a vitrifiable earth. I had before found that the terra ponderosa vitriolata, or heavy gypsum, would dissolve in concentrated vitriolic acid; but always separated in a powdery form upon the affusion of water; and now it appears, that calx vitriolata, or selenite, does the same.

Nitrous acid may be freed from vitriolic and marine acids by solution of silver in the acid of nitre, as is daily practised; but the *marine acid* has not, to my knowledge, been purified by any other method than the laborious one of re-distilling it from common salt. It is generally mixed with vitriolic acid, and often in large proportion. There is no temptation, and scarcely an opportunity, for it to be contaminated by nitrous acid. From the vitriolic acid then it may be readily purified by the addition of terra ponderosa caustica dissolved in water, or by the terra ponderosa salita. If the latter be used, a small portion of the acid must first be tried in a diluted state, from whence we must judge how much of the terra ponderosa salita the whole will require: or else the whole of the acid must be diluted with water. Whether we use the terra ponderosa dissolved in water or in marine acid, in either case the acid of vitriol immediately seizes upon it, and subsides with it in form of an insoluble powder.

As there are reasons for preferring the marine acid in several of the nicer and more important inquiries of chmyistry, this ready method of purifying it cannot but prove acceptable.

Sect. II.

Terra ponderosa vitriolata. Bergman's *Sciagraphia.* § § 58, 89.

Variety.—Heavy Gypsum. Ponderous Spar. Marmor Metallicum. Cronstedt Min. § § 18, 2; 19, 6.

From Kilpatrick-hills near Glasgow. A sort with smaller crystals amongst the iron ore about Ketley, in Shropshire. In the lead mines at Alston-Moor.

More obvious Properties.

White; nearly transparent, but has not the property of double refraction; composed of laminæ of rhomboidal crystals; decrepitates in in the fire. Specific gravity from 4,402 to 4,440.

EXPERIMENTS.

(A) One hundred grains exposed to a red heat for one hour, in a black-lead crucible, lost five grains in weight; but as a sulphureous smell was perceptible, I suspected that a decomposition had taken place, and therefore exposed another portion to a similar heat, for the same space of time, in a tobacco-pipe. This had no smell of sulphur, nor was it diminished in weight.

(2) It is barely fusible under the blow-pipe,

but with borax fluxes readily into a white opake glass.

(B) One hundred grains, ground in a mortar, and washed over extremely fine by repeated additions of water, were boiled in the same water, and after settling, the water was poured off. The powder, when dried, had not sensibly lost weight.

(2) To separate portions of the washing water, were added mild vegetable and mild fossil alkali, but without any appearance of precipitation. Nitre of mercury gave a very slight brownish cloud, barely discernible, and nitre of silver an extremely slight bluish appearance.

(3) The same powder, boiled again in fresh water, did not affect the water at all, for it stood the test of nitre of silver without any change.

(C) Portions of the powder (B) were boiled in vitriolic, nitrous, and muriatic acids, of the usual strength, for several minutes. The acids were then saturated with vegetable fixed alkali, but without any appearance of precipitation, nor had the portions of powder lost any weight.

(2) But when boiled in vitriolic acid, until that acid became very much concentrated and nearly red-hot, the whole of it dissolved, but separated again upon the addition of water, was not altered in its weight, was not acted upon by acids of the usual strength and had under the blow-pipe the properties mentioned at (A 2).

(3) Some of the solution in the concentrated vitriolic acid was left exposed to the atmosphere,

that the acid might slowly attract water. After some days, beautiful crystals appeared in the shapes of stars, faciæ, and other radiated forms.

(4) To another portion of this solution mild fixed vegetable alkali was added, but the precipitate appeared to be the marmor metallicum unchanged.

(D) One ounce of this marmor metallicum in fine powder was fluxed in a crucible with two ounces of salt of tartar, until it ran thin. This substance, boiled with water in a Florence flask, left a residuum of six drams.

(E) This residuum was thrown into water, and pure nitrous acid added, until there was no more effervescence. The undissolved part weighed 52 grains.

(F) This undissolved part appeared to be the original substance no ways changed, for it did not dissolve in nitrous or marine acids, but did wholly dissolve in the greatly concentrated and boiling vitriolic acid, from which it was again separated by the addition of water (C 2).

(G) The solution (D) was saturated with distilled vinegar and then evaporated to dryness, but with less than a boiling heat. The sal diureticus thus formed was washed away with alcohol. The remaining salt weighed 5 drams nearly.

(2) This salt had the appearance and the taste of vitriolated tartar; it decrepitated in the fire, roasted with charcoal dust, it formed a hepar sulphuris, and with muria calcarea gave a precipitation of selenite.

(H) The salt formed with the nitrous acid (E) shot readily into beautiful permanent crystals, of a rough bitterish taste.

(2) Some of this salt was deflagrated with nitre and charcoal, and the alkali afterwards washed away.

(3) The residuum, being the earth of the marmor metallicum, was very white, burnt to lime, and again formed an insoluble compound with acid of vitriol.

(I) One hundred grains of terra ponderosa aërata were dissolved in diluted marine acid. Vitriolic acid was dropped into this solution until no more precipitation ensued. This precipitate, after very careful washing and drying, was exposed to a red heat in a covered tobacco-pipe for half an hour; when cool, it weighed 117 grains.

(2) Fifty grains of terra ponderosa aërata in a lump were put into diluted vitriolic acid; but the action of the acid upon it was hardly sensible, even when made hot.

Marine acid was then added, and after some time an effervescence appeared. The terra ponderosa vitriolata, thus formed, after proper washing and drying, was exposed to a red heat for an hour, it then weighed 58,4 grains.

CONCLUSIONS.

1st. It appears that the marmor metallicum is composed of vitriolic acid and terra ponderosa (D, E, F, G, H).

2dly. That this compound, though probably soluble in water, has so little solubility as almost to escape detection by the nicest chymical tests (B 1, 2, 3).

3dly. That it is not soluble in acids of the usual strength, but that it perfectly and entirely dissolves in highly concentrated vitriolic acid, from which it again separates entire and unchanged upon the affusion of water (C 1, 2).

4thly. That it cannot be decomposed *(via humida)* by mild fixed alkali (C 4).

5thly. That it may be decomposed *(via sicca)*, by the vegetable fixed alkali (D, E, G, H).

6thly. That it may be decomposed by inflammable matter, uniting to its acid and forming sulphur: but that it cannot be decomposed by heat alone (A 1).

7thly. From experiments (I 1, 2) it appears, that 100 parts of this substance contain:—

Vitriolic acid, pure	32,8
Terra ponderosa, pure	67,2
	100

For the 100 parts of terra ponderosa aërata made use of in the experiment (I 1,) would lose during the solution 20,8 of fixed air (Sect. I. A); then deducting 0,6 for the marmor metallicum contained in the terra ponderosa aërata (Sect. I. A 1, 2), there remains 78,6 of pure terra ponderosa. This, when saturated with vitriolic acid, and made perfectly dry, weighed 117; consequently it had taken 38,4 of vitriolic acid.

OBSERVATIONS.

The apparent insolubility of terra ponderosa aërata in the diluted vitriolic acid (I 2) can be accounted for by remarking, that the moment the surface of the lumps was acted upon by the acid, an insoluble coat of marmor metallicum was formed upon it, which effectually precluded any further operation of the acid.

Professor Bergman, in order to obtain the earth from the terra ponderosa vitriolata, directs the latter to be roasted with fixed alkali, and the dust of charcoal; but I have always done it by charcoal-dust alone, though probably this method may require a greater degree of heat.

It has been remarked, that terra ponderosa and calx of lead resemble each other in many respects; and I must add, that the vitriol of lead dissolves in the highly concentrated vitriolic acid much in the same manner that the marmor metallicum does, and like this too, separates upon the affusion of water; but I never observed it disposed to crystallize.

The marmor metallicum may probably be useful in some cases where a powerful flux is wanted; for I once mixed some of it with the black flux, and exposing it to a pretty sharp heat, it entirely ran through the crucible. May not, therefore, some of the more common varieties of it be used advantageously as a flux to some of the more refractory metallic ores?

Sect. III.

Terra Ponderosa Vitriolata.

Variety—Calk or Cauk.
Marmor metallicum, Cronstedt Min. § 18, B.
Plentiful in the mines in Derbyshire.

More obvious Properties.

Of a white or reddish colour; crystallized in rhomboidal laminæ, but these very much intermixed and confused; loses little or nothing of its weight by being made red hot;—specific gravity 4,330.

EXPERIMENTS.

(A) Ground in a mortar, and washed over, the washing water, when decanted, gave no precipitation with mild vegetable alkali; but with nitre of silver and nitre of mercury the slightest cloud imaginable.

(B) One hundred grains boiled in marine acid weighed, after proper washing and drying, 99,5.

(C) The acid solution (B) let fall a Prussian blue, upon the addition of a single drop of phlogisticated fixed alkali; and, when saturated with mild fossil alkali, afforded an ochrey-coloured precipitate.

(D) This precipitate, collected and washed, weighed half a grain. It was roasted with tallow, and then was wholly attracted by a magnet.

(E) A quantity of the cauk, finely powdered, was mixed with charcoal-dust, and roasted in a crucible, at a white heat, for five hours, fresh charcoal-dust being occasionally added. It gave out a strong smell of sulphur.

(F) To this roasted cauk nitrous acid was added, which dissolved the greater part of it, producing, during the solution, some effervescence, and a strong smell of hepar sulphuris.

(G) Some of this solution, after proper evaporation, afforded beautiful crystals, not deliquescent, exactly resembling those obtained from the marmor metallicum (Sect II. H).

(H) To other portions of the solution (F) were added fixed vegetable and fossil alkalies, and likewise volatile alkali, each of which precipitated the earth from the acid.

(I) This earth, after exposure to a white heat for one hour, became caustic, and made lime-water similar in properties to that mentioned at (Sect. I. E).

(K) Some of the part not acted upon by the nitrous acid (F) dissolved entirely by boiling in highly concentrated vitriolic acid, and wholly separated again by the affusion of water. More water was added, and the whole was boiled again; but the filtered liquor gave no signs of precipitation upon the most liberal addition of mild fixed vegetable alkali.

CONCLUSIONS.

It appears, therefore, that 100 parts of Derbyshire cauk contain—

Marmor metallicum	99,5
Calciform iron	0,5
	100

And it is probable, that the redder pieces contain a little more iron.

Sect. IV.

Terra Ponderosa Vitriolata.

Variety—Radiated cauk.

Gypsum crystallisatum capillare. CRONSTEDT Min. § 19, B.

From Pennely by the Bog, near Minsterley, in Shropshire, fifteen miles from Salop, on the road to Montgomery.

More obvious Properties.

Somewhat glossy like satin; yellowish white, opake; composed of slender spiculæ, set close together, and pointing from a centre.

In some pieces there are concentric circles, of a semi-transparent horn-like appearance. It is not very brittle; may be shaved with a knife; loses little or nothing of its weight by being made red-hot. Its specific gravity 4,000; but after soaking one night in the water 4,200 or more.

EXPERIMENTS.

When treated in the same manner that the Derbyshire cauk was, in the preceding section, 100 parts of it appeared to contain—

Marmor metallicum	97,7
Calciform iron	2,3
	100

Suspecting that the presence of so small a proportion of iron could hardly occasion the whole of the apparent differences between the Shropshire and Derbyshire cauks and the marmor metallicum, and thinking it not improbable, that they might contain lead, I mixed some of them with charcoal-dust and borax, but could not by means of the blow-pipe produce any metallic appearance, although vitriol of lead, treated in the same manner, was readily reduced.

I then mixed four parts of cauk with one part of vitriol of lead; the lead could still be reduced, though not so readily as before.

GENERAL OBSERVATIONS.

The terra ponderosa seems to claim a place between the earths and the metallic calces. Like the former, it cannot be made to assume a metallic form; but, like the latter, it may be precipitated from an acid, by means of phlogisticated alkali. In many of its properties it much resembles the calx of lead, and in others, the common calcareous earth, but still seems sufficiently different from that to constitute a new genus, as will appear from a little attention to the following circumstances:—

Terra ponderosa.	*Terra calcarea.*
When dissolved in water, precipitates, upon the addition of the smallest portion of vitriolic acid.	Dissolved in water, does not precipitate upon the addition of vitriolic acid.
Its gypsum, therefore, is insoluble.	Its gypsum, therefore, is insoluble.
With the nitrous and marine acid, forms crystals, which do not deliquesce.	With nitrous and marine acids forms salts so deliquescent that they cannot be kept in a crystallized form.
Decomposes vitriolic salts, *via humida.*	Does not decompose vitriolic salts.

It has been called terra ponderosa, or heavy earth, upon account of the great specific gravity of its gypsum; its spar is likewise heavy enough to countenance such an appellation; but the earth itself does not appear to be a heavy substance, and I imagine the great weight of its compounds, with the vitriolic and aërial acids, is owing to the absence of water.

On the Principle of Acidity, the Decomposition of Water, and Phlogiston.

(Read before the Royal Society, 1788.)

To the Rev. Dr. PRIESTLEY.

Birmingham, February 22, 1788.

DEAR SIR,

I, at length, submit to your consideration the trials which I made upon the liquors you produced by the firing of *dephlogisticated* and *inflammable air* in close vessels; and, if you think proper, you may transmit them to the Royal Society, by way of appendix to your own paper upon that subject.

SECT. I.

December 25, 1787.—*Liquor* produced by burning, in a close copper vessel, *inflammable air* got from *iron* by means of the steam of water, and *dephlogisticated air* expelled by heat only from minium.

This liquor was blue, and contained a reddish brown sediment.

Exp. 1. *Terra ponderosa lime-water*,

2. *Common lime-water*, and

3. *Caustic fixed alkali*, caused a greenish precipitation.

4. *Caustic volatile alkali* produced a beautiful deep blue precipitate, which was wholly re-dissolved by the addition of more volatile alkali.

5. *Phlogisticated alkali* gave a reddish brown precipitate.

6. Nitre of lead, no change.

7. *Nitre of silver*, a bluish precipitate.

8. *Litmus*, its colour first turned red, then curdled, and, at length, nearly destroyed.

9. The *filtering paper* employed to separate the sediment was a slow burning touch-paper.

SECT. II.

December 30.—*Liquor* produced by burning, in a close *copper* vessel, *inflammable air* obtained as in Sect. I. and *dephlogisticated* AIR expelled by heat only from *manganese*.

This liquor was blue, and contained a reddish brown sediment.

Exp. 1 to 9. Similar to those in Sect. I. and the results being in all points the same, I determined to mix the liquids together, the quantities being small, and submit them to further examination.

SECT. III.

Exp. 1. The united liquids being neutralized by the addition of *caustic vegetable alkali*, a beautiful green precipitate subsided.

2. This *precipitate* dissolved entirely in caustic volatile alkali, changing to a beautiful blue.

3. The supernatant liquid being slowly eva-

porated to dryness, the liquor that escaped during this process was nothing but *pure water.*

4. The imperfectly crystallized residuum (3) effervesced upon the addition of concentrated vitriolic acid, and being submitted to distillation, on the first application of heat, an orange-coloured vapour arose, which was condensed in a receiver previously wetted with pure water.

5. The distilled liquor (4) had the smell and the taste of *nitrous acid,* which instantly changed the blue of litmus and that of violet paper to a red, and it acted upon silver.

6. *Terra ponderosa lime-water* added to it occasioned no precipitation.

7. Saturated with vegetable alkali, it converted cap-paper into touch-paper, and formed, upon a slow evaporation, crystals similar to those of nitre.

SECT. IV.

January 21, 1788.—*Liquor* produced by burning *inflammable air,* obtained as before, and *dephlogisticated air* from *mercurius* precip. *ruber,* in a close *tinned iron* vessel.

This liquor was nearly colourless, but contained a large quantity of a light brown sediment.

Exp. 1, 2, 3, 4, 5, 8, 9. Similar to those of Sect. I. and II. except the different colour of the precipitates, and that made by the phlogisticated alkali being a fine blue.

10. The liquor saturated with vegetable alkali being slowly evaporated to dryness, and the pre-

cipitates mixed with the brown sediment being put into a retort, some concentrated vitriolic acid was added and heat was applied. A *very* faint smell of nitrous acid arose, but no visible red vapour, nor did any thing distil into the receiver until the heat was very considerable.

11. The liquor then distilled was evidently acid, but this acid was wholly precipitated by terra ponderosa lime-water.

SECT. V.

Feb. 19.—Having now received a larger quantity of the liquor and sediment, produced as Sect. I. viz. 329 grains of the bluish green liquor, and 12 grains of the reddish brown sediment, I proceeded to repeat the experiments, but the results corresponding with the former ones, I need only to mention, that the liquor changed litmus red, and coagulated it; that with phlogisticated alkali it gave a brownish red, and with caustic vegetable alkali a blue precipitate; that after saturation with the vegetable alkali, both the dried salt and the sediment being submitted to distillation, with the addition of concentrated vitriolic acid, an orange-coloured vapour instantly arose, and the peculiar smell of nitrous acid was strongly perceived. The distilled liquor, besides having the taste of nitrous acid, dissolved silver, and when neutralized by vegetable alkali, and slowly evaporated, afforded well-formed crystals of common nitre.

These, Sir, are all the trials I have made with the liquors produced in your experiments. They pretty clearly prove the acid generated to be the same, whether the dephlogisticated air was procured from red precipitate of mercury, from minium, or from manganese, and that this acid is the *nitrous acid.* It is not quite so clear why the liquor and sediment in Sect. IV. gave no stronger marks of the presence of nitrous acid; but it is evident, that the acid had united itself to the iron, if not to the tin, of the vessel employed: and I find, that when nitrous acid is fully saturated with iron by being boiled with it, and fixed alkali is added, this mixture submitted to distillation, with the addition of concentrated vitriolic acid, yields no red vapours, and very little smell of nitrous acid.

I remain, &c.

WILLIAM WITHERING.

An Account of some extraordinary Effects of Lightning.

(Read before the Royal Society, March 18, 1790.)

On the 24th of June, 1787, about three o'clock in the afternoon, a thunder-cloud came from the south-west; vivid lightning, loud thunder, and much rain escaped from it as it passed. About half-past four o'clock the storm was over; but half an hour afterwards, another cloud, more tremendous than the former, arose from the same quarter. It advanced rapidly, emitting, or perhaps receiving, large quantities of electric matter. It set fire to a house on Birmingham-Heath, and passing on in a direction to the north-east, it struck a house at Sutton Coldfield, which is distant about seven miles from the former place. This house is divided into two dwellings: that which suffered most was inhabited by Mr. W. and a servant. As the storm approached, the lightning and thunder being unusually violent, Mr. W. became alarmed, and, together with his servant, retired into the cellar. A few minutes after their prudent retreat, the stroke, whose effects I am about to describe, took place. The chimney, the tiling, and all the brick-work in the front of the house for the breadth of the windows, were scattered by the explosion with great force both outwardly and inwardly. Some of the bricks were thrown outwards to the distance of one hundred yards, into a field across the road which passes the front of the house, and others thrown inwards so as to break the partition wall of the chamber, and beat down the plaster in a back room; the doors to both chambers being opposite and open, the landing-place from the stairs only intervening. The glass of the windows was much shattered, the lead melted, and both dispersed in various directions. A few days after the explosion I found some of the melted lead sticking against the opposite wall of the chamber. In the front wall was a perforation, nearly adjoining to the bottom of a fire-shovel; a strip of sheet-lead over each of the doors conducted part of the electric matter to the window, cracking the wall as it passed along. Within a window hung a bird-cage, and below the cage, near the fire-place, under the chimney, stood a woman, who felt a strong shock on her shoulders; but the greater part of the electric fluid seemed to have continued its course down the wall, and from thence to the grate, for it perforated the brick-work behind the grate from end to end. Some of the lightning was conducted from within the chimney by four smoothing irons, down a pair of steelyards, and a fire-shovel, from which it burst through the front wall, as before mentioned. The point of each of the smoothing irons, and the handle of each were melted. Every drawer, cupboard, and chest, in the house, locked or unlocked, were forced open, apparently by the sudden expansion of the air within them, in consequence of an external vacuum. The proprietor and his servant felt nothing at the time but pungent pains in their legs, which the former for a moment believed to be caused by bits of broken glass striking against them. This case seems to speak strongly in favour of metallic conductors, there being perhaps scarcely an instance upon record in which so much damage has been done by a single stroke of lightning; and I believe it would not be easy to find a house more completely destitute of good conductors; for, except the lead in the windows, and the strips of lead over the doors, I could discover none. Neither was there any thing in the situation of the house likely to invite the stroke; for it stands on dry ground, on the descent of a hill, with no water near it, except a small puddle occasioned by the waste water from the house. Let me add, also, that the church stands at a small distance, considerably higher upon the hill; that the cloud necessarily passed over the church before it approached the house; and that the former escaped unhurt, though the latter suffered so much. The common opinion that the cellar is the safest place in a house during a thunder-storm receives confirmation from the safety of the inhabitants in this: but another vulgar opinion, that malt liquor is changed by thunder, does not appear to be true; for the malt liquor in this instance suffered no change; though many housekeepers are so persuaded of the fact, that they put smoothing irons upon, and bars of iron against the casks, by way of prevention. Probably the change attributed to the thunder may be caused by the sudden changes in the temperature of the atmosphere, which are so frequently experienced before and after thunder-storms.

Permit me further to request the attention of the Royal Society, whilst I mention a few facts relative to a thunder-cloud, the lightning from which fused a quantity of quartzose matter.

This cloud formed in the south, in the afternoon of Sept. 3, 1789, and took its course nearly due north. In its passage it set fire to a field of standing corn, but the rain presently extinguished the fire. Soon afterwards the lightning struck an oak tree in the Earl of Aylesford's Park at Packington.

The height of this tree is thirty-nine feet, including its trunk, which is thirteen feet. It did not strike the highest bough, but that which projected farthest southward. A man, who had taken shelter against the north side of the tree, was struck dead instantaneously, his clothes set on fire, and the moss (*lichen*) on the trunk of the tree, where the back of his head had rested, was likewise burnt. Two men, spectators of the accident, ran immediately towards him upon seeing him fall; and, as it rained hard, and a small lake had collected almost close to the spot, the fire was very soon extinguished; but the effects of the fire on one half of his body, and on his clothes, were such as to show that the whole burning was instantaneous, not progressive. Part of the electric matter passed down a walking-stick which the man held in his hand, sloping from him; and where the stick rested on the ground it made a perforation about two and a half inches in diameter and five inches deep. This hole I examined soon afterwards, and found nothing in it but the burnt roots of the grass. All observation would probably have ended here, had not Lord Aylesford determined to erect a monument upon the spot, not merely to commemorate the event, but with an inscription, to caution the unwary against the danger of sheltering under a tree during a thunder-storm. In digging the foundation for this monument, the earth was disturbed at the perforation before mentioned, and the soil appeared to be blackened to the depth of about ten inches. At this depth a root of the tree presented itself, which was quite black; but this blackness was only superficial, and did not extend far along it. About two inches deeper, the melted quartzose matter began to appear, and continued in a sloping direction to the depth of eighteen inches.

The specimens which accompany this paper, and for which I am indebted to the attention of Lord Aylesford, will demonstrate the intense heat which must have existed to bring such materials into fusion.

No. 1. A quartz pebble, one corner of which has been completely fused.

No. 2. Sand, unmixed with calcareous matter, agglutinated by the heat. Within the hollow part of this mass, the fusion has been so perfect, that the melted quartzose matter has run down the hollow and assumed nearly a globular figure.

No. 3. Smaller hollow pieces, and one nearly flat, but all the flat ones have some hollow part.*

Mr. Watt suggested to me that the hollows had been occasioned by the expansion of moisture whilst the fusion existed.

I shall conclude with observing, that judging from the damage done to the oak tree, the stroke was not very great; and that having now an inducement to dig where the earth has been perforated by lightning, we may probably hereafter find fossil substances melted by it to a considerably greater extent.

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* These specimens were laid before the Society when the paper was read.

A new Method of preserving Fungi, &c.

(Read before the Linnean Society, Dec. 4, 1792.)

From a conviction that many of the difficulties attendant upon the study of the agarics, and some other genera of Fungi, arose from the want of a method of preserving them in a state fit for comparison one with another, I attempted some years ago to accomplish this purpose, by immersing them in various chymical liquids, and after some trials found it possible to preserve their habit completely, and in some measure also their texture and colours. By the same methods I also found that mosses and lichens might be preserved in great perfection.

A continued attention to this subject gave rise to a great number of experiments: but I shall not trouble the Society with the detail of them, rather confining myself to a more particular description of the two methods which I have found most practicable and efficacious, and only cursorily mentioning some of those that have failed.

No. I.—To half a pound of vitriol of copper, called blue vitriol, reduced to powder, add a pint of cold water; stir them together for a minute, and then throw away the water: upon the remaining vitriol pour half a pint of boiling water, and stir them frequently until the liquor be nearly cool. Set it by in a warm place, for two or three days, to crystallize.

Take any quantity of these crystals, add to them as much hot water as will barely dissolve them, and put the solution into a phial.

To two or three quarts of pure spring water, put as much of this solution of blue vitriol as will give to the whole a very slight bluish tinge: then add to it rectified spirit of wine, in the proportion of a pint to a gallon: filter the liquor through blotting or cap paper, and put it into bottles for use.

No. II.—Dissolve a quarter of an ounce of sugar of lead in a pint of distilled or very pure spring water, made boiling hot, add seven pints of pure cold water, and one pint of rectified spirit of wine: filter the liquor, and keep it in bottles.

The above proportion of spirits of wine is sufficient for the thickest and most succulent specimens, but less will do for such as are thin and not juicy. If the spirit be sufficient to prevent mouldiness, it is enough, for more has a tendency to extract the colours.

Put the specimens to be preserved into wide-mouthed jars made of flint glass, and well fitted with corks: fill the jars quite full with one or other of the above liquids, so as to leave in as little air as possible; cork the jars very close, covering the corks with tin-foil, or thin sheet-lead, such as may be had from the dealers in tea, turning the edge of the lead or tin downwards so as to lap over and under the edge of the jar.

The dark-coloured plants are very apt to discolour the liquor, the milky ones to render it turbid, and some of the juicy ones to excite the vinous fermentation. In any of these cases the liquor must be repeatedly changed.

Agarics may be transported to almost any distance with little damage, by the following method:—Put them into an earthen jar upon a layer of moss a little pressed down, cover them with more moss, carefully filling up the interstices, and thus go on stratifying them until the jar be quite full: pour in the liquid No. I. as long as the moss will continue to imbibe any: then stop the mouth of the jar securely. It may be useful to mention, that when several species are put into one jar, they may be labelled with slips of card-paper, written upon with black-lead pencil.

I have principally used the liquor No. I. but No. II. is best adapted to preserve some of the more tender colours, and it also keeps the texture more firm. Let the botanist, however, be careful not to mix the liquors, nor to change one for the other after a plant has once been wetted with one of them.

Amongst the less successful attempts, I shall just mention that acids, even those of mineral origin, are apt to produce mouldiness; that neutral salts soften and destroy the texture of the plants, though perhaps a weak solution of common salt, with a sufficient quantity of spirit of wine, might be used advantageously for the preservation of fuci, and other marine vegetables.

Earthy salts seem useless, except alum, which preserves them tolerably well for a time, but at length they are apt to become mouldy. Spirit of wine, either by itself or diluted with water, is an excellent preserver of the texture, but destroys the colour of the plants.

No doubt but future experiments will discover methods preferable to those now mentioned, and that we may at length hope to see the cabinet of the naturalist adorned with one of the most varied tribes of the vegetable creation.

A Letter from W. WITHERING, *M.D. F.R.S. to* THOMAS FOWLER, *M.D. Author of "Medical Reports on the Effects of Arsenic," &c.*

Birmingham, May, 1786.

DEAR SIR,

The *Arsenical Solution* was first used here in the autumn of the year 1783, at which time *intermittents* of various denominations were very prevalent both in this and in the adjoining counties. The very general use of the *Tasteless Ague and Fever Drops* at this period made me solicitous to know the composition of that medicine, and I was informed it was made from the ore of cobalt; but as it did not answer to the usual tests for that semi-metal, I thought it was probably arsenic, which is known to abound very generally in cobalt ores. Whilst I was intending to submit the drops to a more effectual examination, Mr. Hughes informed me that he had made an analysis of the drops, and found them to be a solution of arsenic.

At first we gave the medicine cautiously, and were sparing in the doses; but it nevertheless gained our confidence, and in the vernal intermittents of the following year it came into pretty general use. Out of forty-eight patients, thirty-three were cured by the use of the solution alone; three complained of pain in the stomach, loss of appetite, and had swollen faces; but their fevers were cured, and a little soluble tartar removed the symptoms now mentioned. The other twelve patients received no benefit. In the autumn of 1784, it was almost constantly prescribed, and has ever since maintained its credit with us under a very great number of trials. At first we used a simple solution of *arsenicum album*, one grain to each ounce of distilled water. The solution is facilitated by boiling for a minute or two in a Florence flask, or other glass vessel, but long continued boiling disposes it to precipitate again. After some time, Mr. Bayley added nitre to the solution, by the direction of Mr. Hughes, to prevent the precipitation, which in the rapid consumption in the hospital had hardly been observed to take place, but in the smaller demand of private practice seldom fails to happen. I should also mention that an ounce of alcohol has lately been added to twenty ounces of the solution, but I am doubtful of the propriety of this addition. This medicine was given to adults in doses of twenty-five or thirty drops, three times every day, without any regard to the presence or absence of the fever, and the cure was generally effected by about half an ounce. Having had occasion to remark a variety of what you have properly styled *operative* effects, in people who had taken the Tasteless Drops in an indiscriminate and unguarded manner, I thought it an object to ascertain, if possible, the circumstances upon which these unwholesome effects depended. I presently observed that children were less apt to suffer from the medicine than adults; for obvious reasons, therefore, I was induced to give the solution *very largely diluted* in thick gruel, barley-water, or some other mucilaginous liquor. I have likewise desired my patients to avoid exposure to cold, but I am not quite decided whether this latter caution be necessary; the former certainly is so, for out of the great number of patients for whom I have prescribed the medicine, as well in private as in public practice, I do not recollect a single instance in which it produced either sickness, purging, pain, swelling, or any other than *curative* effects. Mr. J. Freer, a very eminent surgeon in Birmingham, who was one of the first to turn his attention to this medicine, tells me he has given it to more than a thousand patients, without either hazard or inconvenience. I think mankind much indebted to your endeavours to rescue a very useful medicine from that oblivion to which the general abuse of it would soon have consigned it; and I am satisfied that in patients where great debility has prevailed, either from old age or other causes, and where the recurrence of the fever under the quotidian form, with the long protraction of the paroxysms and the great irritability of the stomach, has not allowed a sufficient quantity of bark to be given, I have seen their existence preserved by the use of the arsenic. I wish to add much more upon this subject, but time will only allow me to subscribe myself

Yours, very faithfully,

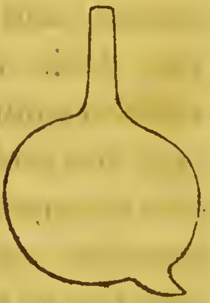
W. WITHERING.

Extract of a Letter from Dr. WITHERING *to Dr.* DUNCAN, *on inhaling Vapour.*

Dr. Withering, in a letter to Dr. Duncan,* gives the following account of a convenient method of inhaling the vapour of volatile substances.

"Having repeatedly had occasion to observe the respiration of asthmatic patients relieved by the vapour of radical vinegar, especially in that stage of the paroxysm in which expectoration is disposed to take place, I wished to contrive a method of inhaling it, which should regulate the quantity taken into the lungs, and should not require any unpleasant exertion on the part of the patient.

"Both these purposes I find to be perfectly answered, by a glass vessel resembling what the chymists call a tubulated receiver, with a conical tube from the side of it, towards the bottom, such as is represented in the margin. The globular part is three and a half inches in diameter; the cylindrical neck three inches long, and one inch in diameter, open at the end; the conical tube about one inch and a half long, with an aperture of one fourth of an inch.



"If four or five drops of radical vinegar are put into this vessel, which may be held in the hand, and the lips applied more or less closely to the mouth of the cylindrical neck, the vapour will pass into the lungs, together with the air which is drawn in through the aperture of the conical tube.

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* Vide Duncan's Annals of Medicine, 1798, p. 447.

"When it is desirable that a very small quantity only of the vapour should be drawn in with the breath, the aperture of the conical tube may be closed by the fore-finger of the hand which holds the glass, and the lower lip only may be brought into contact with the mouth of the cylindrical neck.

"If the inside of the glass be wetted with a solution of camphor in spirit of wine, the spirit soon evaporates, and leaves a coating upon the glass; and, as the warmth of the hand is sufficient to volatilize the camphor, it is evident that its vapour may thus be readily conveyed into the lungs: and I have found it useful in the catarrhus senilis. The vapour of æther, of aqua ammoniæ, and that of spirit of hartshorn, rise with very little heat; but if any substance be used which requires more heat than the hand can supply, the globular part of the vessel may be made to rest upon a cup of hot water, and thus the essential oil of peppermint and other things capable of rising in distillation are easily volatilized.

"Permit me to add a few remarks on the methods used to convey warm watery vapours into the lungs, because I have found them very inadequate to the end proposed, though I am satisfied that such vapours may be used to advantage in cases of peripneumony and in recent catarrhs.

"The late Mr. Mudge, having observed the inefficacy of the means employed for this purpose, invented and published an account of an ingeniously contrived machine, which he called an *inhaler*, by means of which, the air to be inspired was intended to be drawn through a body of hot water. The idea is good, but it cannot be practically followed; for let any man carefully close the joints of the machine, so as to guard against deception, and so that the air to be inspired must really pass through the body of water, and he will find upon trial, that the pressure of the column of water, though only a few inches high, gives so much resistance to the passage of the air as to render this mode of breathing very laborious and troublesome, even to persons in health and strength, and utterly impracticable to invalids.

"I flatter myself that the following method of breathing watery vapour will be found unexceptionable. Partly fill a large jug, or other convenient vessel, with hot water, and place it so that the rising vapour may meet the mouth of the patient. Put into it a few lumps of quick-lime which will presently occasion the water to boil, and to throw out its vapour copiously. By adding a little more lime, from time to time, the process may be continued at pleasure, and the inspired vapour will be more or less hot, and more or less dense, according to the distance of the jug from the mouth of the patient.

"It is but seldom that we see much Typhus in Birmingham. The use of the nitrous vapour, in every instance of its adoption, stopped the further progress of infection."

On Calculous Complaints.

1782.

Dr. Withering states, that his rude conceptions were thus for the first time committed to writing, in compliance with the wishes of Dr. F. and his friends. After detailing the various practices which for a time prevailed, but afterwards successively fell into disrepute, and alluding to the general idea that stones in the bladder are principally composed of calcareous earth, fixed air, and some animal gluten, the Doctor proceeds:

"After Dr. Hales had found that urinary calculi contained very large quantities of fixed air and observed that bodies deprived of fixed air, were likewise deprived of cohesive power, it was suggested that substances greedily imbibing this cementing principle would probably dissolve stones in the bladder, or rather occasion them to fall to pieces; accordingly, soap-lees, lime-water, and caustic vegetable alkali, were largely prescribed. Some seemingly happy trials at first gave wings to hopeful imagination, and it required a series of years to convince mankind that a cure for the stone was yet wanting. At length when Mr. Lane discovered that calcareous earth supersaturated with fixed air became soluble in water, and that the earthy matter in some springs was thus suspended, a flattering scene opened upon the minds of medical practitioners. They reasoned thus: stones in the bladder are principally composed of calcareous earth, fixed air, and some animal gluten; we have in vain attempted, by caustic alkalies, &c. to dissolve them by taking away their fixed air; for these caustic substances become saturated with fixed air long before they can be supposed to reach the bladder; but now, by adding more fixed air, as in the case of chalk or lime-stone, we can render them soluble, and fixed air may be taken into the stomach in great quantity without nauseous or detrimental effects. Dr. Percival occasioned a young man to drink largely of fixed air water, and found that his urine was impregnated with fixed air; so that it was judged capable of mixing with the circulating fluids, and passing the secretions without being changed. Dr. Saunders published the case of a man in Guy's Hospital who laboured under excruciating torments from a stone in his bladder; but, in consequence of drinking largely of fixed air water and swallowing effervescing mixtures, he lost his pains, and the stone seemed to come away in fragments. Dr. Falconer made some experiments to show that pieces of calculi in a glass vessel were in part dissolved in water impregnated with fixed air. In this narration I quote only from memory, and therefore must beg indulgence for any unintentional errors.

"Upon the authority of these gentlemen, with whom I am well acquainted, and of whose zeal and veracity I could not doubt, I began to put their plan in practice; but, under experience of its efficacy, I sought how to render it still more efficacious, and contrived to inject the fixed air itself into the bladder. This was accomplished without any great difficulty or pain, and the patients were readily persuaded to give it a trial, drinking, at the same time, fixed air water effervescing. Some found no relief, others thought themselves almost cured; but the event was in no case decidedly favourable, and they gradually dropped the method of cure. In time, they all became as ill as ever; and even the hospital patient died in a violent paroxysm of the disorder, and after death the stone was found in the bladder. Now it is not in human nature to prefer a painful disorder to an easy remedy, and when men become tired of prosecuting the method devised for their cure, I much suspect that the physician is unequal to his task. In this situation I furnished myself with a very great variety of calculi, and began to make experiments upon them. I found them soluble in a small degree in Nooth's fixed air apparatus; but I found, too, that they were equally soluble in water without fixed air; by very long standing, and moderate agitation, they may, in a great measure, be dissolved in any water. I then, for the first time, began to suspect that our reasonings and practical inferences were derived from false data, and immediately subjected calculi of every different appearance to chymical examination; and you know that my method of analysis does not change or destroy the component parts of the subject. I soon found that not one of them contained a single particle of calcareous earth; nor would it be easy to demonstrate that they contain any earth at all. They are all inflammable; they are all soluble in the nitrous acid, and from this solution no earthy precipitate can be obtained. In short, they seem to be similar to other animal substances. Convinced that mistaken principles had led us to erroneous practice, I began to look out for better; these must be learnt from the attentive observation of nature and from facts supported upon the basis of large experience; of course, the accessions must be slow: thus they stand at present.

"The urine is a fluid composed of water, bile, and excrementitious animal substance: the animal substance is suspended in a state of solution in the water and bile. In the urine of a healthy man the suspension of the dissolved parts is perfect, both whilst the urine remains in, and after it has been ejected from the body; but when the menstruum is nearly saturated with the solvend, the abstraction of a few degrees of heat occasions a separation. The parts thus separated may be again dissolved by bringing the fluid into a warmer place. The separation of these parts is promoted by an irregular surface in the vessel: thus we observe that the incrustations are chiefly found upon the rougher parts. Every stone that I have examined appears to be formed upon a nucleus: this nucleus is most frequently a large piece of gravel that has passed down from the kidneys into the bladder: sometimes it is a little coagulated blood: but I believe any kind of solid would be sufficient, and I think it probable that no stone would ever be formed in the bladder if a nucleus did not previously exist to favour the deposition of the excrementitious animal substance. The sand or gravel that is found in the hollow of the kidneys is evidently a crystallization, and such crystals are sometimes formed in the urine when out of the body: these crystals do not essentially differ from the other deposited matter. These depositions and these crystallizations must depend either upon the menstruum being too weak, or in too small quantity to support the solvend in a state of solution, or else from the latter being from some cause or other unapt to remain dissolved. But these conditions do not seem to be induced by any very general causes. Dogs, horses, and men, or, in other words, carnivorous, herbivorous, and omnivorous animals are all subject to the stone. Whether the drink be hard or soft water, ale, beer, cyder, or wine, the disease will be produced, and very young children, who have scarcely tasted any thing but milk, are not exempt from it. In some patients, after the operation, the disease never returns; in others a new stone will be formed in the course of two or three years.

"The bladder calculi, when cut through, appear to consist of concentric layers, and are undoubtedly formed by the opposition of parts: but the smoothness upon the surface of these coats or layers, their ready separation, their differing colours, and other observable circumstances, lead me to conclude that during the formation of these stones there has not been any uniform regular addition; but on the contrary, that a very considerable space of time must frequently have elapsed between the finishing of one coat and the formation of another.

"The practical inferences deducible from these observations are—When a fit of the gravel, as it is called, is over, that is, when a concretion has passed from the hollow of the kidney down the ureter into the bladder, the patient must not be allowed to think himself well because relieved from pain: he must never be satisfied until he sees his enemy in his hand; and this may always be effected by teaching him to dilute freely; to retain his water until the bladder is considerably distended, and then to part with it in a proper position. If these simple rules were universally inculcated, I am persuaded we should not have many patients suffering from the stone. It must be the study of the physician to investigate those causes that occasion the excrementitious animal matter so readily to separate from its menstruum. I need not point out how various these may be; but if, independent of any peculiar attention of the physician or patient, the tendency to concretion is sometimes suspended for a considerable length of time, notwithstanding the existence of a nucleus, and at others altogether; surely we may be allowed to hope that we shall at length be able to produce and imitate these causes. I am persuaded that a deficiency of good bile is one very general cause of this tendency to premature separation, and I know from experience that bile is a solvend of urinary calculi. When the excrementitious secretion is not faulty in itself, but only separates for want of a proper quantity or quality of the menstruum, copious dilution is one obvious remedy: another is to divert this matter as much as possible from the kidneys, so as to discharge it by the skin. I am certain that nothing more effectually brings on an attack of the usual symptoms than a sudden check to the perspiration. In case of a stone already formed, I believe that if no further accretion was allowed to take place, it would soon be smoothed, and in time washed away or absorbed."

Directions for the Treatment of the Case of B. F———, *LL.D. an aged Patient, suffering from a large Stone in the Bladder. Addressed to Dr.* VAUGHAN, *at Paris.*

" Believing the passing of the stone to be impossible, the extraction of it unadvisable, and that no known medicine can dissolve it, I shall turn my attention to such methods as will be most likely to prevent its increase. These consist in

" Encouraging perspiration, in order to pass off as much as possible of the excrementitious animal matter through the pores of the skin, and to leave less to be discharged with the urine.

" Strengthening the solvent powers of the bile, by which the excrementitious part of the urine is rendered soluble in its watery part.

" Diluting freely, as well with a view of supporting an abundant insensible perspiration, as of supplying a sufficient proportion of watery menstruum to the kidneys and bladder.

" To fulfil these intentions, I advise the patient

" To wear a flannel shirt next his skin.

" To use a warm bath once a fortnight or three weeks, and whilst in the bath to have the skin chafed with a piece of coarse cloth.

" To avoid those exposures which check the insensible perspiration.

" Eat a plentiful dinner of animal food, using salt freely, and every vegetable except those usually eaten without boiling. All the onion tribe are particularly recommended: ripe fruits are not included in the exception. Supper, a basin of gruel, well impregnated with onions. Fruit will be best eaten an hour or two before dinner. Strawberries, two or three pints a day through the season, if the bowels will bear them in such quantity.

"To dilute freely, with

"Spring water, hard or soft. Chalybeate waters, as those of Spa or Pyrmont. Wine in moderation; but good small beer is one of the best liquors.

"Infuse an ounce of liquorice-root, sliced in a pint of boiling water, all night: to drink one half fasting every morning, the other half at bed-time.

"I hardly know a medicine I wish you to take.

"If again troubled with kidney concretions, you will probably find that fifty drops of balsam of capivi, taken twice a day, will prevent their further formation. Equal weights of essential oil of juniper and sweet spirit of nitre, mixed with an equal bulk of mucilage of gum arabic, I have sometimes thought useful in detaching the looser lamina of stones. I direct two spoonfuls of the mixture to be taken daily in half a pint of small ale: to some patients it proves too heating."

REMARKS, MEDICAL:

Extracted from Memoranda or Letters.

FEN AGUES.

"Some of the most obstinate have fallen under my care. A perfect cure is best effected by *Corrosive Sublimate.*"

INTERMITTENTS.

(1782.) "At length we have obtained a kind of bark which in its effects corresponds with that originally brought to Europe. We call it *Red Bark,* or *Prize Bark,* being taken out of a Spanish prize. I know not whether it be a different species, or only the larger bark of the same tree in a less decayed state, but I am persuaded it is the medicine that was used by Morton and Sydenham, or its efficacy could never have been so proverbial. Its colour approaches to that of Armenian bole.

"An English tanner would laugh at the man who should ask him whether the bark of the trunk or that of the twigs be the best: and yet all our druggists and Materia Medica writers recommend the fine *Quill Bark.* In short, I have not been able for more than seven years to cure a single intermittent, even of the tertian type, by the fashionable bark, and yet I have given two ounces between the fits. But it may be necessary to observe, that a physician is seldom consulted here in fevers of the intermittent kind, unless some anomalous appearances, or uncommon obstinacy in the recurrence of the attacks, alarm the patient or his friends.

"On the other hand, though we have seen a prodigious number of intermittents lately, many of them of the obstinate quartan kind, I have not met with one instance in which the recurrence was not prevented by two or three drams of the *Red Bark.*

"The *Tincture* it makes is very rich. The *Decoction* requires only three drams to a pint; but I generally prefer the *Powder*, in doses of fifteen or twenty grains.

Extract of a Letter to Dr. Saunders, *dated June,* 1782.

"The universal prevalence of *intermittent fevers* this Spring afforded ample experience of the efficacy of the *red bark.* We have not many intermittents in the town of Birmingham, but in other parts of the county of Warwick, in Shropshire, Staffordshire, Worcestershire, and Oxfordshire, so far as my rides extend, they have been more general than was ever before known by the oldest practitioners.

" After taking pains to recommend the *red bark* to all the apothecaries I met with, and consequently being not less anxious to learn its effects, I can say that they unanimously concur in asserting that they have never been disappointed in their expectations when they exhibited it to patients labouring under intermittents.

" The fevers I have seen have generally assumed the tertian type in light soils, and the quartan type in clayey countries. Of the latter I have had the care of some which originated in Kent and Essex."

(1785.) " I feel disappointed that the *Cinchona caribbœa* will not supply the place of the *red bark;* but regret it the less, as the *arsenic* seems perfectly to succeed in the cure of *intermittents.*

" Seventy cases of tertians and quartans occurred last year in the General Hospital near Birmingham, all of which were cured by the *arsenic*, without a single exception. None of them relapsed, nor did we experience the least inconvenience from the use of the medicine.

" One grain of *white arsenic* is dissolved in one ounce of distilled water. The arsenic must be in fine powder, and the solution made by agitation in a phial; then filtered.

" The dose may be from fifteen to forty drops, thrice a day, in two ounces of common julep, or simple mint-water, given during the absence of the paroxysms, which gradually diminish, and usually cease in about a week."

DIABETES MELLITIS.

In early practice, Dr. Withering indulged a hope of curing this disease by the use of resin; but, as he subsequently adopted other means, it may be presumed that his success was not complete.

At a later period (1793), he writes: "My ideas respecting *Diabetes* by no means accord with those commonly entertained, and they led me, in consequence, to try new methods of cure; and as it is my intention to lay these matters before the public, when I can find leisure for such a purpose, I cannot just now explain myself more particularly than I have done. *Lime-water* does a little; *bark* still less; but *tincture of cantharides* is tolerably efficacious in suspending the progress of the disease, though I never saw it effect a cure, except in recent cases, where the symptoms could scarcely be considered as confirmed."

"As to my idea of *siliceous matter* in the (Bristol) *Hot-well water*,* it will be sufficient to state, that in the course of conversation, I suggested the probability of this being the case, partly from the established efficacy of the water in Diabetes, and partly from an actual examination of the *strata* and other circumstances connected with these springs."

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* In reference to Dr. Carrick's ingenious "Dissertation on the properties of the Hot-well Water," (1797,) Dr. Withering observes—"That author concludes that this water does not contain siliceous earth; but I think his own experiments rather lead to a contrary opinion. Thus, (Exp. 18) he finds one-

And in 1798:—" I am much delighted at present by the hope of verifying a discovery of some importance in medicine, viz. a cure for *Diabetes*. It is a subject which has long occupied my thoughts; but the disorder not being of frequent occurrence, a length of time is requisite to prevent me leading myself or others into error. The total *abstinence from vegetable food*, Dr. Rollo's plan, certainly produces benefit, but it does not cure."

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eighth of a grain of a powder insoluble in hot or cold water, neither effervescing with nor soluble in acids. This powder, in Exp. 3, seems to have passed the filtre in the cold water there used, and he is surprised to find any part of it now insoluble. I suspect that the *moleculæ* of silex had not then had time or opportunity to coalesce together, and to assume a visible form. He tells us that he had since often repeated this operation upon the salts obtained from the water at other times, and that he finds the quantity of this *insoluble matter* obtainable from a gallon of the water to be rather more than half a grain. He says it is undoubtedly nothing but selenite. But selenite is soluble in vitriolic acid, and the whole quantity of this powder, if nothing but selenite, would have dissolved in the distilled water which was used."

The Medicine for Diabetes,

according to Dr. Withering's prescription:

"R. Sodæ, ℥iij.
Silicis subtilis. pulv. ℥i, in crucibulo simul liquescant, igne modico.
R. Hujus Silicis Alkalisati, ʒij.
Aq. pur. ℥ij. Fiat solutio.
Capt. gtt. xx ter die in Aq. tepidæ, ℔ ß.

"The drops may be increased to thirty or forty in each dose, adding, or not, to each dose fifteen drops of dilute marine acid, which is the quantity of acid necessary to saturate the alkali.

"Each dram of the silex alkalisat. should contain fifteen grains of silex."*

SYPHILIS.

(1783.) "My plan of treatment of such disorders has proved very successful, though different from that of others, both in the facility and expedition of the cure, as well as a dispensation from the usual restraint in diet and seclusion. It is the result of deliberation, cautiously brought forward into active practice."

"I have lately read a book† in which the author, without any communication with me, has adopted a method in almost every respect the same as mine. It is written by Dr. Swediaur. There are two or three points, rather doctrinal than practical, in which we do not agree; but in these I will not affirm that I am right, though I cannot surrender them without better cause for so doing than he has yet shown."

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* Sufficient trial has not yet been made to determine whether the *very obvious and immediate good effects* of this preparation be permanent.—Ed.

† Practical Observations, by F. Swediaur, M.D.

(1783.) "The stimulating and saline preparations of *mercury*, which pass off by the skin and the kidneys, taken with *large* dilution and the use of flannel, never affect the mouth, though the bowels of some patients will not bear them.

"The *corrosive sublimate* dissolved in the proportion of six grains to one ounce of distilled water used to be my medicine: but from some late changes in the mode of preparing it, it will not keep suspended, and, consequently, is always varying in its strength. This has induced me to look out for a preparation not liable to be decomposed in a state of solution, and yet not difficult to prepare. To these characters the *hydrargyrum nitratum* perfectly answers, and for many months past I have used no other preparation of mercury in syphilitic complaints. I saturate *pure* nitrous acid, diluted with four times its quantity of distilled water, with as much quicksilver as it can dissolve; by a very gentle evaporation this solution forms beautiful and permanent crystals: six grains of these crystals dissolved in one ounce of *pure* water, produces a medicine which will generally be borne in doses of twenty-five or thirty drops."

(1790.) " I have lately experienced very excellent effects from Dr. Swediaur's *Decoctum roborans.** It was long before I could get it properly prepared, and I more than once relinquished its use; but Dr. Swediaur still assuring me that the faults lay in the mode of preparation, and not in the medicine, I have for some time past been using it again, and have now found his assertion to be true."

" I have succeeded in curing a case which for three years had defied the effects of *mercury* in all its forms, and two salivations of six or eight weeks continuance each. Afterwards a variety of other means were used to little purpose, and I have at length eradicated the disease by a continuation of upwards of five months of *mercury,* inwardly and outwardly applied in as great quantity as the bowels and salivary glands would bear.

" I mention this case as curious from the length of time necessary to cure the disease; but such instances are rare."

(1797.) " After so much has been said of the efficacy of *nitrous acid* in the cure of *syphilis,* by men both of character and experience, and from the testimony of such a number of cases, that it would seem unreasonable to doubt it, yet neither myself nor any of my brethren here have seen a single case cured by it.

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* Pharm. Syphilit. p. 282.

"I have found it highly useful in constitutions worn out and poisoned by *mercury*, in counteracting its pernicious effects, and have sometimes entirely suspended the use of the latter medicine for weeks together, giving the acid in full doses; but I have always been compelled to recur to *mercury*, by an increase or a return of the symptoms.

"In *hepatic affections* I have been more fortunate."

SICK HEADACH.

(1783.) "So frequently met with in women from increased irritability, and often in studious and thinking men. Living well, so as to occasion the gout, I am persuaded, would cure the sufferer. The constant use of a flannel shirt, a moderate use of Madeira wine, and plentiful feeding upon animal diet, seems to bring relief.

"*Opium*, with *volatile alkali*, in a full dose, will sometimes, taken in the beginning of a fit, and aided by stillness, put it by: but every stimulus, either near to or remote from the seat of the disease, increases the symptoms."

(1791.) "These complaints gradually wear away with increasing years. That they sometimes depend upon affections of the stomach is true; but they much oftener exist where no such connexion can be discovered. It seems as if the disease depends upon a morbid sensibility of the brain or its membranes, induced probably, in certain constitutions, by long continued habits of life, and that the paroxysms are caused by an accumulated irritability. I have observed that the attacks are less frequent when the patient takes much strong walking exercise in the open air; but no plan of medicine avails materially."

CARBUNCLE.

The unremitting application of *cold water*, by affusion and wet compresses, proved a successful remedy, even in large tumours of persons advanced in life.

ANGINA PECTORIS.

Dr. Withering had the satisfaction to relieve and entirely cure many cases (either with or without issues in the thighs,) by the use of *seneka*, according to the following prescription:—

—— Fontinell:—
R. Senek. ʒiß.
Glyc. ʒij.
Aq. font. ℔ß. Coque per 10 et cola.

R. Hujus colat. ℥iß.
Sp. Vol. Fæt. ʒi.
F. h. bis terve die sumend.

HYDROCEPHALUS.

"I was long a sceptic as to the efficacy of *mercury* in curing *Hydrocephalus internus*, suspecting that the cases so cured were only worm cases; but a late example has taught me otherwise, and that I failed before from using the mercury too sparingly."

"In the early stage of this disorder *nitre* and *leeches* prove advantageous; nor should the low state of the pulse deter from the topical application."

It has been remarked that in the real disease of this kind *mercury* does not produce salivation, even when used in very large quantities.

Dr. Snowden, of Spelman's Court, near Stroud, having consulted Dr. Withering on the clearly-marked case of his daughter, aged four years, thus reports the result:—

1786.—"I have waited with impatience for the perfect recovery of my dear little girl, to thank you for the very great kindness your letter conveyed to me, in answer to one I took the liberty of writing, requesting the favour of your opinion respecting her case.

"I would observe that the little patient could not take the smallest quantity of calomel without its occasioning great sickness, in consequence of which, our sole dependance was on the external use of mercury.

" I would further observe, that the many ounces of strong mercurial ointment we had occasion to make use of had not the least effect on the mouth; and I think we need not doubt the efficacy of the ointment, when I tell you that it raised a salivation on the mother, who slept with the child, though every precaution was taken to prevent such an effect.

" I am now satisfied with you, Sir, that *mercury*, in an incipient *Hydrocephalus*, so far as the testimony of one case will prove, is its certain cure; and I am the more convinced of it that in this instance it indisputably relieved the child's pains more than once."

In the case of Master W———, a young gentleman who was permanently cured of *Hydrocephalus internus*, between the 29th of October and the 10th of April following, nineteen ounces and six drams of strong mercurial ointment were used, the quantity being increased from two drams to half an ounce daily, and to one ounce daily during the last fortnight.

In the progress of this case, one hundred and sixty-eight grains of calomel were also given in equal daily portions.

The prescriptions were as follow:—

1784.
Oct. 29. V. S. ad ℥vi.
R. Calomel, gr. viii. Ft. pil. iv.
Ung. Merc. ʒij.
30. Rep.
31. V. S.
R. Tart Emet. gr. i. solv. in Aq. font. bull. ℥i.
adde
Syr. Mecon. ʒi.
Th. Thebaic. gtt. vii.
Rep. Pil. Merc.
Nov. 1. Rep. Haust. Anod.
Rep. Ung. Merc. ʒij.
3. Rep. Pil. Merc.
5. R. Pulv. Jalap. gr. viii.
Calom. gr. ij. Mitte ch. 2.
Applic. Empl. Vesic. occip.
Rep. Pil. Merc.
Rep. Ung. Merc.
8. Rep.
11. Rep.
13. Rep.
14. Vesic. parti dolenti.
15. Rep. Ung. Merc.
17. Rep.
Rep. Pil. Merc.
21. Rep. Empl. Vesic. parti dolenti.
22. Rep. Pil. Merc.
Rep. Ung. Merc.
23. R. Fol. Digit. p. gr. vi.
Calom. ℈i. Ft. pil. xii.
27. R. Calom. gr. xii.
Cons. gr. i.
Th. Theb. ut ft. pil. iv.

1784.
Nov. 27. Applic. Vesic. occip. larg.
Haust. Sud. Anod.
28. Rep. Ung. Merc.
29. Rep. Pil. Merc.
30. R. Calom. gr. iv. Ft. pil.
Mist. Salin.
Rep. Ung. Merc.
Dec. 1. Rep. ℥ß. viz. d. Q.
Rep. Pil. Merc.
2. Rep. Pil. un. Calom.
3. Rep.
Rep. Ung. Merc. ℥ß.
4. Rep. Pil. Merc.
5. Rep. Pil. Merc.
Rep. Ung. Merc. ℥ß.
7. Rep. Pil. Merc.
Rep. Ung. Merc.
10. Rep. Pil. iv. Merc.
11. Rep. Ung. Merc. ℥ß.
14. Rep. Pil. Merc. iv.
Rep. Ung. Merc. ℥ß.
17. Rep.
19. Rep. Pil. Merc. iv.
Rep. Ung. Merc. ℥i. viz. d. Q.
24. Rep. Pil. Merc. iv.
Rep. Ung. Merc. ℥i.
1785.
Jan. 2. Rep. Ung. Merc. ℥i.
Rep. Pil. Merc.
18. Rep. Ung. Merc. ℥i.
20. Rep. Pil. iv. Calom.
24. Rep.
Rep. Ung. Merc. ℥i.
28. Rep. Ung. Merc. ℥i.

1785.
Jan. 30. Empl. Vesicat. cerv. cap.
R. Pulv. Jalap. gr. xv.
Cal. gr. v. statim. sum.
31. Rep. Ung. Merc. ℥i.
Rep. Pil. Merc.
Feb. 2. Rep. Ung. Merc. ℥i.
Mar. 21. Vesic. occip.
Ung. Merc. ℥i.
27. Rep. Ung. Merc. ℥i.
Apr. 1. Rep. Ung. Merc. ℥i.
4. Rep. Ung. Merc. ℥i.
10. Rep. Ung. Merc. ℥i.

DIGITALIS PURPUREA—*(Purple Foxglove)*

Has been highly extolled in pectoral complaints by Fuchsius, Gerard, Parkinson, and others; and latterly by Salmon, Saunders, Drs. Drake and Fowler, who state *consumptions* of the lungs to be infallibly cured by a decoction of the Foxglove leaves.

Dr. Fowler remarks, that "Dr. Withering's opinion of it, (notwithstanding his expressed wish that it may be further tried in this disease,) was not, it is true, very encouraging; but it should be recollected, that even with him it succeeded completely in one case, (No. CXX.) that it relieved another (No. XL.) very far advanced, and that the remaining cases in which it was given by him, were lost before recourse was had to the Digitalis."

Dr. Withering's subsequent experience of the antiphthisical powers of the Foxglove warrant the conclusion that its effects are merely, though very serviceably, palliative. In various cases it reduced the frequency of the pulse, and abated the hectic symptoms; but in no instance effected a permanent cure.

In the cure of *Epilepsy*, (arising from effusion,) Dr. Withering proved the *Digitalis* to be completely successful: and, from the concurrent testimony of several practitioners, there is reason to hope, that the disorder, when occasioned by other causes, will be found to yield to the same remedy.

Dr. Currie's Essay, prepared for the Medical Journal, contains strong confirmation of Dr. Withering's experience.

By the application of *Fol. Digital. Recent.* (fresh Foxglove leaves,) renewed night and morning, Dr. Withering was in the habit of removing *Bronchocele*.

CONIUM MACULATUM.—*(Hemlock.)*

" For some years I have used the powdered leaves with great advantage in what are called humoral complaints, as *Chronic Rheumatism*, and unkindly *Gout*.

" The dose may be from fifteen to twenty grains, so as to produce a slight degree of giddiness, and to be repeated thrice a day."

DAPHNE GNIDIUM.

" In Portugal the bark of this plant is used as a topical application to keep up a perpetual discharge. It is less painful and troublesome than the common blister ointment. I brought some of the bark home with me, and have used it satisfactorily. I expect the *Daphne Laureola* may answer equally well.

" Twigs of this plant, the thickness of a finger, might be obtained from the London gardeners. Cutting a longitudinal and circular incision, the bark will peel off the size required. It should be dried under pressure, to keep the pieces flat. Soak a piece in hot water for a few minutes, lay it on the skin, securing it by adhesive plaster, and in a day or two the effect will be produced."

THE END.

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